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## CURRENT WORLD PREVALENCE OF COMMUNICABLE DISEASES<sup>1</sup>

United States, February 12-March 10, 1928

The mortality in large cities during the first 10 weeks of 1928 has been very favorable and has followed very closely that of last year. A slight increase occurred at the end of February as was to be expected, but the seasonal rise in mortality has been unusually slight. The annual rate for 68 cities for the 10 weeks ended March 10 was 13.8 per 1,000, which is the same as for the corresponding period of 1927.

*Influenza.*—The cases of influenza reported by 31 States increased at the end of February and beginning of March, but not sharply enough to indicate an epidemic situation. The reported cases averaged about 1,600 weekly for the first eight weeks, and the number increased to 2,163 cases in the week ended March 3 and 2,996 cases in the week ended March 10. The incidence has been very similar to that reported a year ago. In 1927 the seasonal maximum was passed in the week ended March 12, and in 1926, when the disease was epidemic, the maximum was passed a week later.

In certain Southern States, notably in Alabama, Arkansas, and Louisiana, the reported incidence of influenza has been somewhat higher than it was a year ago; but the number of cases has shown no tendency to rise continuously for several weeks in a characteristic epidemic curve. The influenza and pneumonia death rate by weeks up to February 18 also indicates a greater prevalence of respiratory conditions in the South Central States this year than a year ago; but in the remainder of the country, the weekly mortality from these causes has varied about the level of that in 1927.

*Smallpox.*—The prevalence of smallpox showed no further increase in the four weeks ended March 10, when 4,465 cases were reported by 42 States as compared with 4,618 cases in the preceding four-week period; but this is approximately 1,000 more cases than were reported in the corresponding four-week period a year ago. For the most part, the incidence of the cases in different parts of the country in the

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<sup>1</sup> From the Office of Statistical Investigations, United States Public Health Service.

four weeks ended March 10 was unchanged as compared with the incidence in the preceding weeks.<sup>1</sup> The outbreak in Connecticut was promptly brought under control and only 10 cases were reported in the four weeks ended March 10, as against 126 in the preceding six weeks. An increase in cases is shown in the Arizona reports; 146 cases were reported in the four weeks ended March 10 as compared with 27 cases from January 1 to February 11.

*Scarlet fever.*—The number of cases of scarlet fever reported each week by 41 States continued to vary around 5,000 up to the week ended March 10. The disease has been less prevalent in the current year than at the corresponding season of last year, but a little more prevalent than it was two years ago. In none of the States does the incidence suggest any epidemic situation. The period of relatively high seasonal prevalence is rather wide in the case of scarlet fever and the disease may be expected to continue at the present level for several weeks.

*Diphtheria.*—The number of cases of diphtheria reported weekly by 41 States has been declining since the week ended February 4; in that week 2,250 cases were reported, whereas in the week ended March 10, 1,700 cases were reported. The maximum incidence occurred a little later in the present year than in either 1926 or 1927. The incidence in the current year has not differed significantly from that in 1927, but has been somewhat higher both in January and February than in the corresponding season of 1926.

*Measles.*—Measles cases continued to increase during February and the first part of March, and some further increase is likely, since the seasonal decline normally does not set in until quite late in the spring. There were 33,520 cases reported by 41 States in the two weeks ended March 10, as compared with 31,775 and 26,386 cases, respectively, in the two weeks ended February 25 and February 11. The incidence is still slightly above that reported last year, as was noted in the review of last month, but the number of cases is now smaller than the total reported by the same States in corresponding weeks of 1926, which was a "measles year." The reported incidence would seem to indicate that the disease is epidemic to some extent in the current year in about one-half the States scattered throughout the country.

*Poliomyelitis.*—There were fewer new cases of poliomyelitis in the four weeks ended March 10 than in the preceding four weeks, but more than in the corresponding weeks of either of the two preceding years. The 35 different States which reported one or more cases during this four-week period reported a total of 147 cases; California reported the largest number, 27 cases, Massachusetts

<sup>1</sup> Public Health Reports, Mar. 9, 1928.

reported 13 cases, New York reported 15 cases, and Oregon reported 9 cases.

*Typhoid fever.*—Cases of typhoid fever declined slightly during February; 41 States reported 118 cases in the week ended March 10, as against 215 cases in the week ended February 4. The disease has been less prevalent than in either of the two preceding years in most States.

#### Foreign Countries<sup>1</sup>

No unusual epidemic situation prevailed during December or January in any of the foreign countries for which the health section of the League of Nations had received reports. As in the United States, the general mortality in European towns reflected only a normal seasonal increase. Full official information on the widespread epidemic of influenza in Japan, which has been reported in the newspapers, is not yet available.<sup>2</sup> The prevalence for certain epidemic diseases is summarized below, chiefly from information taken from the League of Nations' Monthly Epidemiological Report.

*Cholera.*—Port towns in the Far East which reported any cases of cholera during the five weeks ended February 4 included only Singapore, Bangkok, Saigon and Cholon, Samarang, and five towns in British India. Calcutta, with 123 deaths in these five weeks, and Bangkok, with 55 cases in four weeks of January, are the only towns reporting more than six cases or deaths in January. In Bangkok, a definite increase in the incidence of the disease during January is indicated; only one or two cases were reported weekly during November and December, but in January the number increased gradually, and 28 cases were reported in the week ended January 28.

An increase in cholera incidence in French Indo-China occurred at the end of December. In Annam, 174 cases were reported in the first 20 days of January, as compared with 22 cases in the month of December; in Cochin-China, 165 cases were reported in the same period, as compared with 113 in December. No increase had occurred in Cambodia, Laos, or Tonkin.

In India, the incidence of cholera declined steadily during December; 2,353 deaths were reported in the week ended December 31 as against 4,835 in the week ended November 26, but the deaths were still much above the normal for the season. The late autumn outbreaks in Bengal, Assam, Bihar and Orissa, and in Madras Presidency reached a maximum toward the end of November, and the disease declined rapidly in the succeeding weeks in each of these areas.

*Plague.*—The outbreak of plague at Aden, which began January 9, continued to spread, and up to February 11 there had been 197 cases

<sup>1</sup> Data from the Monthly Epidemiological Report of the Health Section of the League of Nations' Secretariat, Feb. 15, 1928, supplemented by information published in the Public Health Reports.

<sup>2</sup> See p. 790. —Ed.

and 111 deaths reported. The number of cases increased each week and 89 cases were reported in the week ended February 11. One case occurred on January 19 at Baghdad, where there had been no plague since June. Five cases of plague were reported at Suez in the first five weeks of 1928, and these were the only cases reported in Egypt in this period.

No case of plague was reported in January from any Mediterranean port. Four cases were reported on the island of Teneriffe and three on the island of Las Palmas.

In Nigeria, the plague incidence in January continued lower than for several years past; 15 cases were reported in the five weeks ended February 4 as compared with 12 cases in the preceding five-week period. In the Union of South Africa, only 3 cases of plague were reported in January, all in inland districts, as compared with 6 cases in December and 9 in November.

The plague situation in India as a whole continued good in December, although there was a marked increase in cases about the middle of the month, followed by a drop to the previous level at the end of the month. The increase was due to a rapid spread of the disease in the United Provinces, as shown in the table below.

*Plague cases reported in the United Provinces by two-week periods in the years 1924-1927*

| Year | Oct. 23-Nov. 5 | Nov. 6-19 | Nov. 20-Dec. 3 | Dec. 4-17 | Dec. 18-31 |
|------|----------------|-----------|----------------|-----------|------------|
| 1927 | 67             | 136       | 408            | 837       | 596        |
| 1926 | 60             | 200       | 312            | 421       | 285        |
| 1925 | 45             | 84        | 336            | 557       | 541        |
| 1924 | 280            | 316       | 580            | 783       | 709        |

The plague outbreak in the Madura district of the Madras Presidency also continued to increase in December. The plague incidence in most provinces was unusually favorable.

Since May, 1927, deaths from plague in Java have been somewhat more numerous than in 1926; the incidence remains, nevertheless, well below that of 1924 and 1925, when plague reached its greatest extension in Java. The disease continues to be most prevalent in the central part of the island; its incidence decreased in Kedu, which was the province most affected in 1926, but increased markedly in Pekalongan and Cheribon, both provinces on the northern coast.

*Deaths in Java during the 20 weeks ended December 5*

|                   | 1925  | 1926  | 1927  |
|-------------------|-------|-------|-------|
| Java, total.....  | 5,683 | 2,599 | 3,342 |
| East Java.....    | 141   | 14    | 101   |
| Central Java..... | 4,753 | 2,445 | 2,712 |
| West Java.....    | 789   | 140   | 559   |

Plague was less prevalent in Peru in 1927 than in any year since its introduction in 1903. During the first 11 months of the year there were 188 cases and 62 deaths, as compared with 1,200 cases in 1926 and 418 cases in 1924, the previous low year. There were 14 cases and 4 deaths reported in December.

Plague incidence in Guayaquil has remained practically the same for several years. In January 4 cases were reported, and the number of cases varied from 3 to 9 a month for the preceding six months.

Two cases of plague were reported at Buenos Aires in the week ended February 11 and one each in Rosario and Santiago Province in the following week. Four cases had occurred at Rosario in January.

*Yellow fever.*—Yellow fever cases and deaths which were officially reported in West Africa in the past three years are shown in the accompanying table.

*Yellow fever cases and deaths in West Africa, 1925-1927*

| Country         | 1925  |        | 1926  |        | 1927  |        |
|-----------------|-------|--------|-------|--------|-------|--------|
|                 | Cases | Deaths | Cases | Deaths | Cases | Deaths |
| Ivory Coast     | 3     | 1      | 0     | 0      | 3     | 3      |
| Dahomey         | 0     | 0      | 2     | 1      | 4     | 4      |
| Upper Volta     | 0     | 0      | 2     | 2      | 0     | 0      |
| Niger Territory | 0     | 0      | 0     | 0      | 1     | 1      |
| Senegal         | 0     | 0      | 27    | 23     | 116   | 100    |
| French Sudan    | 6     | 4      | 5     | 4      | 0     | 0      |
| Gold Coast      | 7     | 4      | 23    | 13     | 107   | 41     |
| Nigeria         | 21    | 14     | 11    | 7      | 3     | 2      |
| French Togo     | 0     | 0      | 0     | 0      | 8     | 8      |

A short summary of the history of yellow fever, of the more important scientific investigations that have been carried out, and of recent epidemics is published in the February Epidemiological Report.

*Smallpox.*—In England and Wales the seasonal increase in smallpox cases was quite marked during January, but the number of cases reported in the four weeks ended January 28 (1,461 cases) was considerably smaller than that for the corresponding period of 1927 (2,184 cases). The disease is prevalent over a larger area in the current year than was the case a year ago, having spread to a new center in South Wales and to the Midlands and southern counties.

Smallpox cases continued to increase in the French Protectorate of Morocco; 398 cases were reported in December as against 140 in November and 81 in October. In Algeria, where smallpox was widespread during 1927, the number of cases has been declining; only 39 cases were reported in the first three weeks of 1928 as compared with 154 in the preceding three weeks. In Tunis only 3 cases occurred between November 26 and January 21.

Returns for smallpox cases in India for November and December were considerably lower in 1927 than in 1926. Bengal, southern

Assam, Orissa, and eastern Bihar had, as usual in recent years, the highest incidence.

The noteworthy decrease in the smallpox incidence and case fatality rate in Java continued throughout 1927. During the first 48 weeks of that year there were 281 cases and 8 deaths, in comparison with 5,994 cases and 1,301 deaths in 1924, 4,652 cases and 508 deaths in 1925, and 819 cases and 87 deaths in 1926. The case mortality rate was 21.7 per cent in 1924, 10.9 per cent in 1925, 10.6 per cent in 1926, and 2.8 per cent in 1927. An active vaccination campaign has been carried out in recent years.

*Typhus.*—The number of typhus cases reported in Europe, excluding the Union of Socialist Soviet Republics, was about the same in 1927 as in the preceding two years. In Latvia, Poland, the Kingdom of the Serbs, Croats, and Slovenes, and Greece, the incidence decreased from 1925 to 1927, but it increased at the same time in Lithuania, Rumania, and Bulgaria. Fewer cases, however, were reported in December, 1927, than in the corresponding month of any previous year in all of these countries.

TABLE 1.—*Typhus cases reported in various countries of Europe and North Africa*

| Country                                    | 1924   | 1925  | 1926  | 1927  |
|--|--------|-------|-------|-------|
| Estonia                                    | 43     | 21    | 24    | 18    |
| Latvia                                     | 290    | 96    | 72    | 30    |
| Lithuania                                  | 618    | 221   | 325   | 450   |
| Poland                                     | 7,706  | 4,196 | 3,568 | 3,039 |
| Czechoslovakia                             | 44     | 204   | 167   | 190   |
| Hungary                                    | 229    | 33    | 10    | 5     |
| Rumania                                    | 3,312  | 1,892 | 2,355 | 2,803 |
| Kingdom of the Serbs, Croats, and Slovenes | 319    | 388   | 109   | 117   |
| Bulgaria                                   | 197    | 217   | 238   | 207   |
| Greece                                     | 266    | 102   | 68    | 39    |
| Total                                      | 13,624 | 7,370 | 7,026 | 7,167 |
| Egypt                                      | 1,683  | 1,314 | 966   | 792   |
| Tunis                                      | 209    | 404   | 425   | 413   |
| Algeria                                    | 471    | 540   | 311   | 889   |
| Morocco                                    |        | 510   | 559   | 1,653 |

Typhus was less prevalent in the third quarter of 1927 than during the corresponding period of 1926 in the Central Industrial and Black So'l Districts of the Union of Socialist Soviet Republics as well as in the Ukraine; the incidence was slightly higher, on the other hand, in northern and eastern Russia.

There was a marked increase of typhus fever in 1927 in Algeria and Morocco. During the first four weeks of 1928, 813 cases of typhus fever were reported in French Morocco, as compared with 111 in January, 1927.

*Influenza.*—There is no sign of any serious influenza epidemic in the January statistics of European countries. The number of deaths

attributed to influenza in large towns of England and Wales, which had been slowly increasing in December, began to decrease after the first week of January, an unusual occurrence. The number of deaths from influenza in German towns was low during the first two weeks of January. There was a slight increase in Paris, where 23 deaths were ascribed to influenza in December and 74 deaths in January.

There were 12 deaths from influenza in December at Madrid, 13 at Milan, 7 at Lyons, 6 at Prague, and 2 at Vienna, which shows a relatively low incidence for the season.

**Measles.**—Measles was moderately epidemic in most European countries during the last quarter of 1927, but the incidence was nowhere higher than is normally the case during the increases which usually occur every two or three years. The incidence in the third quarter of 1927 was lower than it was during the corresponding period of 1926 only in the Union of Socialist Soviet Republics, Estonia, Poland, Bulgaria, Greece, Albania, Malta, and Spain. The indications are that in many countries the maximum of the present winter will be passed earlier than usual.

**Whooping cough.**—Whooping cough shows no unusual prevalence in any of the countries for which information is available. The incidence was well below the normal during the fourth quarter of 1927 in England and in Denmark.

#### CURRENT STATE MORTALITY STATISTICS

For the information of public health officials and others interested, the data in the following tables have been taken from the monthly mortality reports of State health departments for the latest month for which published records are available. Statistics of most communicable diseases are not included, since they are available in other tabulations in the Public Health Reports. Statistics of deaths from other causes are limited for the most part to those causes which appear in the State reports. In the case of States which publish detailed mortality reports each month, the record of only the principal groups of causes and certain important specific causes have been used.

For purposes of comparison, the mortality records for the corresponding month in a few preceding years have been compiled. The rates have been computed upon the populations as estimated for July 1 of each year represented.

These tabulations will be enlarged as the current data on mortality from additional States become available.

## Alabama

| Death classification, by cause or age                            | December                            |         |                       |       |
|--|-------------------------------------|---------|-----------------------|-------|
|  | 1927                                | 1926    | 1927                  | 1926  |
|  | White                               | Colored | Annual rate per 1,000 |       |
| All causes.....  | 11.3                                | 9.9     | 17.0                  | 15.1  |
| Infant mortality.....  | 65.3                                | (1)     | 91.8                  | (1)   |
|  | Annual rate per 100,000 live births |         |                       |       |
| Influenza.....   | 43.7                                | 24.4    | 67.1                  | 38.1  |
| Tuberculosis, all forms.....                                     | 48.8                                | 36.2    | 147.4                 | 172.2 |
| Cancer, all forms.....   | 59.8                                | 57.6    | 56.6                  | 40.7  |
| Diabetes mellitus.....   | 16.8                                | 8.9     | 9.2                   | 5.3   |
| Cerebral hemorrhage, apoplexy.....                               | 62.7                                | 61.3    | 80.3                  | 71.0  |
| Diseases of heart.....   | 115.1                               | 95.3    | 144.7                 | 134.1 |
| Pneumonia, all forms.....  | 136.3                               | 85.7    | 155.3                 | 107.8 |
| Diarrhea and enteritis (under 2 years).....                      | 19.7                                | 10.3    | 17.1                  | 10.5  |
| Chronic nephritis.....   | 79.4                                | 76.1    | 122.7                 | 97.3  |
| Puerperal state.....   | 18.9                                | 14.0    | 18.4                  | 22.7  |
| Congenital malformation and other diseases of early infancy..... | 80.9                                | 76.1    | 85.5                  | 81.5  |
| Automobile accidents.....  | 24.0                                | 20.0    | 9.2                   | 18.4  |
|  | Number of deaths                    |         |                       |       |
| Under 1 year.....  | 259                                 | 203     | 205                   | 151   |
| 1-4 years.....   | 104                                 | 105     | 58                    | 57    |
| 5-14 years.....  | 73                                  | 47      | 56                    | 56    |
| 15-44 years.....   | 271                                 | 257     | 399                   | 406   |
| 45-64 years.....   | 277                                 | 250     | 317                   | 230   |
| 65 years and over.....   | 545                                 | 459     | 247                   | 218   |
| Age not stated.....  | 12                                  | 9       | 11                    | 10    |

## Connecticut

| Death classification, by cause or age       | December                |       |       |       |       |       |
|---|-------------------------|-------|-------|-------|-------|-------|
|   | 1927                    | 1926  | 1925  | 1924  | 1923  | 1922  |
|   | Annual rate per 1,000   |       |       |       |       |       |
| All causes.....                             | 10.9                    | 12.1  | 11.9  | 11.4  | 11.1  | 13.1  |
| Infant mortality.....                       | 66.6                    | 66.6  | 72.4  | 68.2  | 66.2  | 81.9  |
|   | Annual rate per 100,000 |       |       |       |       |       |
| Influenza.....                              | 21.5                    | 26.4  | 25.9  | 33.7  | 16.8  | 22.0  |
| Tuberculosis, all forms.....                | 57.9                    | 82.3  | 69.3  | 76.0  | 89.4  | 90.3  |
| Cancer.....                                 | 103.9                   | 115.6 | 108.5 | 101.1 | 99.0  | 99.2  |
| Diseases of the heart.....                  | 186.3                   | 216.8 | 205.5 | 165.9 | 145.3 | (1)   |
| Pneumonia, all forms.....                   | 100.9                   | 121.6 | 138.2 | 107.4 | 118.1 | 102.2 |
| Diarrhea and enteritis (under 2 years)..... | 7.4                     | 7.6   | 16.2  | 8.6   | 12.8  | 13.8  |
| Puerperal diseases.....                     | 6.7                     | 13.6  | 6.9   | 7.1   | 12.0  | 8.1   |
|   | Number of deaths        |       |       |       |       |       |
| Under 1 year.....                           | 158                     | 160   | 178   | 158   | 168   | 211   |
| 1-4 years.....                              | 44                      | 52    | 62    | 49    | 72    | 97    |
| 5-64 years.....                             | 679                     | 780   | 680   | 660   | 679   | 737   |
| 65 years and over.....                      | 594                     | 609   | 623   | 584   | 466   | 566   |

<sup>1</sup> Not available.

## Indiana

| Death classification, by cause or age  | December |       |       |       |       |       |
|--|----------|-------|-------|-------|-------|-------|
|  | 1927     | 1926  | 1925  | 1924  | 1923  | 1922  |
| Annual rate per 1,000                  |          |       |       |       |       |       |
| All causes                             | 11.9     | 12.1  | 12.4  | 11.8  | 11.6  | 12.2  |
| Rate per 1,000 live births             |          |       |       |       |       |       |
| Infant mortality                       | 61.4     | 75.7  | 69.9  | 63.4  | 72.4  | 84.6  |
| Annual rate per 100,000                |          |       |       |       |       |       |
| Influenza                              | 23.9     | 36.2  | 36.5  | 31.9  | 22.1  | 25.5  |
| Tuberculosis, all forms                | 69.2     | 66.0  | 73.4  | 74.1  | 71.1  | 72.6  |
| Cancer                                 | 102.0    | 96.5  | 105.5 | 94.5  | 90.9  | 95.9  |
| Apoplexy                               | 123.3    | 113.1 | 106.5 | 111.4 | (1)   | (1)   |
| Organic heart disease                  | 183.2    | 179.0 | 165.5 | 161.3 | (1)   | (1)   |
| Pneumonia, lobar and broncho           | 117.0    | 120.6 | 139.6 | 117.9 | 92.8  | 140.1 |
| Diarrhea and enteritis (under 2 years) | 4.5      | 7.2   | 10.3  | 11.1  | 12.4  | 15.7  |
| Bright's disease                       | 74.8     | 75.4  | 72.3  | 90.5  | (1)   | (1)   |
| Puerperal causes                       | 9.7      | 10.6  | 9.1   | 5.0   | 5.0   | 3.5   |
| Number of deaths                       |          |       |       |       |       |       |
| Under 1 year                           | 294      | 350   | 332   | 324   | 355   | 417   |
| 1-4 years                              | 96       | 124   | 114   | 96    | 123   | 227   |
| 5-14 years                             | 70       | 75    | 65    | 80    | 119   | 115   |
| 15-64 years                            | 1,289    | 1,253 | 1,269 | 1,233 | 1,212 | 1,117 |
| 65 years and over                      | 1,423    | 1,390 | 1,433 | 1,340 | 1,172 | 1,235 |

## New York State (exclusive of New York City)

| Death classification, by cause or age                                   | December |       |       |       |       |
|---|----------|-------|-------|-------|-------|
|   | 1927     | 1926  | 1925  | 1924  | 1923  |
| Annual rate per 1,000   |          |       |       |       |       |
| 1-205 All causes  | 12.8     | 13.3  | 15.0  | 14.7  | 13.4  |
| Rate per 1,000 live births  |          |       |       |       |       |
| Infant mortality  | 72       | 72    | 73    | 77    | 80    |
| Annual rate per 100,000   |          |       |       |       |       |
| 11 Influenza  | 13.3     | 13.5  | 16.7  | 22.6  | 9.3   |
| 31-37 Tuberculosis, all forms   | 62.3     | 73.1  | 95.3  | 80.1  | 85.6  |
| 43-49 Cancer and other malignant tumors                                 | 122.6    | 117.6 | 127.8 | 129.7 | 114.6 |
| 57 Diabetes mellitus  | 21.2     | 24.2  | 29.5  | 25.7  | 22.9  |
| 70-86 Diseases of the nervous system and of the organs of special sense | 151.9    | 172.0 | 191.9 | 203.3 | 188.5 |
| 74 Cerebral hemorrhage, apoplexy  | 118.5    | 133.1 | 149.5 | 154.0 | 144.6 |
| 87-96 Diseases of the circulatory system                                | 854.6    | 868.2 | 864.7 | 860.2 | 890.4 |
| 90 Other diseases of the heart  | 276.8    | 273.5 | 289.2 | 281.8 | 223.8 |
| 97-107 Diseases of the respiratory system                               | 117.8    | 137.9 | 161.6 | 141.6 | 119.9 |
| 100, 101 Pneumonia, broncho and lobar                                   | 99.2     | 117.8 | 138.5 | 122.2 | 99.5  |
| 108-127 Diseases of the digestive system                                | 68.6     | 74.4  | 81.3  | 81.4  | 87.5  |
| 113 Diarrhea and enteritis (under 2 years)                              | 11.8     | 12.9  | 17.7  | 18.7  | 23.2  |
| 128-142 Nonvenereal diseases of the genito-urinary system               | 125.3    | 131.2 | 142.0 | 141.4 | 123.1 |
| 128, 129 Nephritis, all forms   | 115.1    | 121.3 | 129.2 | 125.5 | 109.2 |
| 143-150 The puerperal state   | 9.0      | 8.3   | 12.3  | 9.7   | 11.9  |
| 151-158 Diseases of the skin and of the bones and organs of locomotion  | 3.4      | 5.2   | 4.6   | 4.6   | 4.4   |
| 159-163 Malformations and diseases of early infancy                     | 67.3     | 69.4  | 76.2  | 80.2  | 82.0  |
| 165-203 External causes   | 92.8     | 84.0  | 101.6 | 93.2  | 105.6 |
| 188c Automobile accidents   | 59.7     | 52.7  | 50.6  | 46.8  | 21.1  |
| Number of deaths  |          |       |       |       |       |
| Under 1 year  | 540      | 518   | 565   | 625   | 618   |
| 1-4 years   | 147      | 153   | 195   | 174   | 174   |
| 5-64 years  | 2,639    | 2,687 | 2,686 | 2,704 | 2,484 |
| 65 years and over   | 2,649    | 2,730 | 2,736 | 2,585 | 2,234 |

\* Not available.

\* Puerperal septicemia.

## Tennessee

| Death classification by cause |   | December— |       |
|-------------------------------|---|-----------|-------|
|                               |   | 1927      | 1926  |
| Annual rate per 1,000         |   |           |       |
| 1-205                         | All causes.....                             | 13.6      | 12.7  |
| Annual rate per 100,000       |   |           |       |
| 11                            | Influenza.....                              | 52.1      | (1)   |
| 31-37                         | Tuberculosis, all forms.....                | 145.0     | 131.2 |
| 43-49                         | Cancer.....                                 | 64.4      | (1)   |
| 100-101                       | Pneumonia, all forms.....                   | 163.0     | 116.9 |
| 113                           | Diarrhea and enteritis (under 2 years)..... | 14.2      | 14.8  |
| 146                           | Puerperal septicemia.....                   | 5.2       | (1)   |
| 188c                          | Automobile accidents.....                   | 17.5      | 11.0  |

## Michigan

| Death classification by cause |  | November— |      |      |      |      |
|-------------------------------|--|-----------|------|------|------|------|
|                               |  | 1927      | 1926 | 1925 | 1924 | 1923 |
| Annual death rate per 1,000   |  |           |      |      |      |      |
| All causes.....               |  | 11.6      | 12.6 | 11.6 | 10.7 | 12.4 |
| Rate per 1,000 live births    |  |           |      |      |      |      |
| Infant mortality.....         |  | 62.1      | 68.1 | 69.0 | 67.2 | 12.0 |

## Pennsylvania

| Death classification by cause        |   | November |       |       |       |       |
|--------------------------------------|---|----------|-------|-------|-------|-------|
|                                      |   | 1927     | 1926  | 1925  | 1924  | 1923  |
| Annual rate per 1,000                |   |          |       |       |       |       |
| 1-205                                | All causes.....   | 11.5     | 11.7  | 12.0  | 12.0  | 11.8  |
| Rate per 1,000 live births           |   |          |       |       |       |       |
| Infant mortality.....                |   | 64.2     | 72.1  | 74.1  | (1)   | (1)   |
| Annual rate per 100,000 <sup>4</sup> |   |          |       |       |       |       |
| 11                                   | Influenza.....  | 19.5     | 19.8  | 21.6  | 19.8  | 14.0  |
| 31-37                                | Tuberculosis, all forms.....  | 63.4     | 65.3  | 68.7  | 72.3  | 71.0  |
| 43-49                                | Cancer.....   | 99.3     | 99.7  | 87.6  | 95.9  | 92.0  |
| 57                                   | Diabetes.....   | 19.4     | 19.3  | 18.4  | 16.4  | (1)   |
| 74-83                                | Apoplexy, softening of brain.....   | 88.1     | 91.2  | 63.9  | (1)   | (1)   |
| 87-90                                | Heart disease.....  | 225.0    | 214.0 | 199.0 | (1)   | (1)   |
| 100-101                              | Pneumonia, all forms.....   | 92.2     | 120.0 | 140.0 | 131.0 | 125.0 |
| 113                                  | Enteritis (under 2 years).....  | 22.4     | 22.9  | 25.4  | 31.4  | 29.0  |
| 128-129                              | Nephritis, all forms.....   | 97.8     | 106.0 | 105.0 | 108.0 | (1)   |
| 143-150                              | The puerperal state <sup>5</sup> .....                                    | 4.7      | 5.9   | 6.3   | (1)   | (1)   |
| 159-163                              | Congenital malformations and diseases of early infancy <sup>6</sup> ..... | 34.7     | 36.2  | 35.7  | (1)   | (1)   |
| 188c                                 | Automobile accidents.....   | 23.2     | 22.4  | 18.8  | 20.0  | 24.0  |

<sup>1</sup> Not available.<sup>2</sup> United States mortality statistics.<sup>3</sup> Not ascertainable.<sup>4</sup> Except the puerperal state and diseases of early infancy.<sup>5</sup> Rate per 1,000 total births.<sup>6</sup> Rate per 1,000 live births.

## New Jersey

| Death classification by cause, or age   | October |       |       |        |        |        |
|---|---------|-------|-------|--------|--------|--------|
|   | 1927    | 1926  | 1925  | 1924   | 1923   | 1922   |
| Annual rate per 1,000   |         |       |       |        |        |        |
| All causes.....   | 10.5    | 10.2  | 11.3  | 10.5   | 11.0   | 10.8   |
| Annual rate per 100,000   |         |       |       |        |        |        |
| Influenza.....  | 5.0     | 5.4   | 5.2   | 4.3    | 5.8    | 4.6    |
| Tuberculosis, all forms.....  | 70.7    | 66.2  | 68.4  | 74.5   | 80.7   | 85.2   |
| Cancer.....   | 106.2   | 108.8 | 106.6 | 82.2   | 107.2  | 93.3   |
| Diseases of the nervous system.....   | 99.9    | 119.7 | 125.3 | 120.0  | 111.3  | 123.5  |
| Diseases of the circulatory system.....                                       | 229.9   | 211.6 | 234.4 | 199.2  | 197.9  | 174.2  |
| Diseases of the respiratory system (pneumonia and tuberculosis excepted)..... | 31.1    | 38.7  | 43.8  | 50.8   | 46.0   | 46.1   |
| Pneumonia.....  | 32.0    | 33.3  | 54.9  | 45.8   | 33.7   | 37.3   |
| Diseases of the digestive system.....   | 66.9    | 55.7  | 60.8  | 1 61.5 | 1 61.5 | 1 56.0 |
| Infantile diarrhea.....   | 17.3    | 23.7  | 32.1  | 30.8   | 39.5   | 54.2   |
| Bright's disease.....   | 90.8    | 94.7  | 101.1 | 92.9   | 98.9   | 92.9   |
| Automobile accidents.....   | 29.5    | 23.7  | (9)   | 24.7   | 28.5   | (9)    |
| Number of deaths  |         |       |       |        |        |        |
| Under 1 year.....   | 332     | 335   | 419   | 409    | 435    | 480    |
| 1-4 years.....  | 107     | 113   | 143   | 139    | 143    | 186    |
| 5-9 years.....  | 1,559   | 1,427 | 1,526 | 1,381  | 1,444  | 1,348  |
| 60 years and over.....  | 1,333   | 1,304 | 1,374 | 1,223  | 1,165  | 1,084  |

<sup>1</sup> Infantile diarrhea excepted.<sup>2</sup> Not available.

## New York State, 1927 and 1926

The following statistics are taken from the Health News of February 13, 1928, published by the New York State Department of Health:

## Mortality in New York State in 1927 and 1926

| Death classification by cause | 1927 | 1926 | Average<br>1922-1926 |
|-------------------------------|------|------|----------------------|
| Rate per 1,000                |      |      |                      |
| Births.....                   | 10.9 | 10.8 | 20.0                 |
| Deaths, all causes.....       | 12.3 | 13.4 | 12.9                 |
| Rate per 1,000 live births    |      |      |                      |
| Infant mortality.....         | 59   | 70   | 71                   |
| Rate per 1,000 total births   |      |      |                      |
| Stillbirths.....              | 40   | 42   | 42                   |

*Mortality in New York State in 1927 and 1926—Continued*

| Death classification by cause          | 1927  | 1926  | Average<br>1922-1926 |
|--|-------|-------|----------------------|
| Annual rate per 100,000                |       |       |                      |
| Typhoid                                | 1.7   | 2.6   |                      |
| Measles                                | 1.6   | 8.4   |                      |
| Whooping cough                         | 4.2   | 5.4   |                      |
| Diphtheria                             | 8.6   | 6.4   |                      |
| Tuberculosis, all forms                | 81.9  | 89.1  |                      |
| Cancer, all forms                      | 124.3 | 119.8 |                      |
| Diabetes                               | 24.4  | 24.5  |                      |
| Alcoholism                             | 8.1   | 8.1   |                      |
| Diseases of the heart                  | 276.9 | 289.6 |                      |
| Bronchitis                             | 5.0   | 7.0   |                      |
| Pneumonia, all forms                   | 107.2 | 148.8 |                      |
| Diarrhea and enteritis (under 2 years) | 13.1  | 17.4  |                      |
| Nephritis, acute and chronic           | 82.7  | 96.2  |                      |
| Suicide                                | 16.0  | 14.3  |                      |
| Automobile accidents                   | 21.2  | 19.7  |                      |
| Homicide                               | 5.0   | 4.4   |                      |
| Accidents                              | 80.7  | 82.5  |                      |

Commenting upon these statistics, the *Health News* said:

The health of the people of the State of New York in 1927 was exceptionally good. The total number of deaths was less than a year ago by more than 10,000, mainly because of a lessened volume of mortality from tuberculosis, pneumonia, and diseases of the heart and kidneys. The death rate (12.3 per 1,000 population) was never lower and was equaled but once in 43 years. Infant mortality (59 deaths under one year per 1,000 live births) was the lowest recorded since 1904, when these deaths were first compiled separately. Mortality from most of the diseases of childhood, with the exception of diphtheria, also showed a gratifying decrease.

With reference to the decrease in deaths from diseases of the heart, the further comment is made:

We must not, however, ascribe too much significance to this decline because the high death rate in 1926 was directly influenced by an extraneous factor—the abnormally severe weather during the first months of the year. The present death rate from diseases of the heart, with the single exception of the preceding year, is still greater than ever before.

With respect to other causes, the *Health News* continues:

The death rate from pneumonia declined 28 per cent and the proportion of deaths due to this cause was only 8.7 as compared with 11.1 in 100 deaths last year. Here, too, we recall the very high mortality in February, March, and April, 1926. But, unlike diseases of the heart, the death rate from pneumonia in 1927 was, with one exception, the lowest ever recorded.

Cancer, with the highest mortality on record, is now second among the causes of death. A year ago it was third, in 1917 it was fifth, and 20 years ago it was eighth—being preceded in order by pneumonia, tuberculosis, diseases of the heart, acute and chronic nephritis, diarrhea and enteritis (under 2 years), accidents and cerebral hemorrhage and apoplexy.

The death rates from nephritis, acute and chronic, and from tuberculosis, all forms, have never been lower. The decline in the tuberculosis death rate was the greatest recorded in any one year since 1921 and the 1927 rate was one-half of the rate recorded only 10 years ago. The reduction in the death rate from

accidents was less than that which occurred in the mortality from all causes and the relative importance of this group has increased somewhat, from 6.2 to 6.6 per cent.

#### Ohio, 1927 and 1926

The following statistics are taken from the Ohio Health News of February 15, 1928, published by the Ohio State Department of Health:

##### *Mortality in Ohio in 1927 and 1926*

| Death classification by cause                                  | 1927   | 1926   |
|--|--------|--------|
| Annual rate per 1,000  |        |        |
| All causes.....  | 11.2   | 12.2   |
| Rate per 1,000 live births                                     |        |        |
| Infant mortality.....  | 63     | 76     |
| 'Annual rate per 100,000                                       |        |        |
| Typhoid fever.....   | 2.76   | 4.49   |
| Smallpox.....  | .15    | .01    |
| Measles.....   | .55    | 12.51  |
| Scarlet fever.....   | 2.36   | 2.92   |
| Whooping cough.....  | 4.03   | 10.11  |
| Diphtheria.....  | 7.78   | 7.51   |
| Influenza.....   | 22.41  | 39.67  |
| Acute poliomyelitis.....                                       | 2.56   | .68    |
| Meningococcus meningitis.....                                  | .67    | .51    |
| Rabies.....  | .17    | .00    |
| Tuberculosis, all forms.....                                   | 70.82  | 79.00  |
| Other epidemic, endemic, infectious diseases.....              | 16.58  | 19.18  |
| Cancer, all forms.....   | 95.53  | 100.31 |
| Cerebral hemorrhage.....                                       | 101.60 | 110.15 |
| Heart diseases, all forms.....                                 | 203.56 | 201.47 |
| Broncho pneumonia.....   | 36.42  | 48.08  |
| Lobar pneumonia.....   | 44.17  | 51.87  |
| Diarrhea and enteritis (under 2 years).....                    | 13.42  | 22.91  |
| Diarrhea and enteritis (over 2 years).....                     | 5.04   | 6.36   |
| Nephritis.....   | 87.98  | 87.68  |
| The puerperal state.....                                       | 10.36  | 13.08  |
| Congenital malformation, deaths peculiar to early infancy..... | 65.47  | 72.74  |
| Suicides.....  | 13.13  | 13.50  |
| Railroad accidents.....  | 9.50   | 9.63   |
| Street-car accidents.....                                      | 1.93   | 2.42   |
| Automobile accidents.....                                      | 22.05  | 20.63  |
| Homicides.....   | 7.81   | 8.40   |
| All others.....  | 265.79 | 277.97 |

The Ohio Health News, after pointing to the decreases in the general death rate and in the infant mortality rates, comments as follows:

Marked decreases in numbers of deaths were reported in the following diseases: Typhoid fever, measles, scarlet fever, whooping cough, influenza, tuberculosis (all forms), cancer, diarrhea and enteritis, and causes peculiar to early infancy. Causes of deaths showing increases were: Smallpox, diphtheria, acute anterior poliomyelitis, rabies, diseases of the heart, Bright's disease, and automobile accidents.

Only 40 of the 88 counties did not report deaths from poliomyelitis during the epidemic of last summer and fall. Eight counties reported deaths from smallpox and nine from rabies.

## THE PROBLEM OF AUTOMOBILE EXHAUST GAS IN STREETS AND REPAIR SHOPS OF LARGE CITIES

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### Nature of Problem

That automobile exhaust gas is highly poisonous has been established beyond question. Perhaps no other toxic substance has received so much attention of late, as indicated by the ever increasing literature on the subject. Scarcely a day passes without mention in the newspapers of a serious accident from automobile exhaust-gas poisoning occurring in garages. It is also well known that among garage workers chronic poisoning, or, perhaps, more correctly, continuous acute poisoning, is common. The seriousness of this hazard in public and private garages and repair shops has been recognized by health authorities throughout the country and is beginning to receive the serious consideration it justly deserves.

Due to the increasing number of automobiles, the problem of the pollution of the air of city streets has come to the fore and many hygienists express deep concern over this problem. Certain types of automobiles of large gasoline consumption, such as trucks and omnibuses, are becoming almost as numerous in the streets of large cities as pleasure cars; and with the new systems of traffic control in vogue in the cities, much starting, stopping, and idling of engines has become necessary. All these factors are conducive to the greater production of exhaust gas, so that at times a haze of blue smoke may actually be seen hanging over the streets of some of our cities. The smoke and its accompanying smell of burnt oil are not, however, an index of the toxicity of exhaust gas. It is generally agreed that the most dangerous substance issuing from the exhaust of an automobile is carbon monoxide, a very subtle poison, in that it is colorless and practically odorless, although usually present in automobile exhaust gas in high concentrations. Carbon monoxide is highly poisonous, because it displaces the oxygen from the hemoglobin molecule, causing asphyxia of the tissues. Most authorities on the physiology of carbon-monoxide poisoning believe that all of the clinical manifestations arising from the breathing of carbon monoxide may be explained on the basis of oxygen privation.

The amount of carbon monoxide produced depends chiefly upon the adjustment of the carburetor, as shown by the investigators of the United States Bureau of Mines (1). In connection with the problems involved in the ventilation of the vehicular tunnel now operating under the Hudson River between New York City and New Jersey, it was necessary to determine the amount and composition of exhaust gas from automobiles. The workers of the

Bureau of Mines undertook this problem and made road tests on 101 automobiles and trucks operated under all sorts of conditions, which showed that the carbon monoxide varied from 0.5 to 14 per cent of the total exhaust gases, averaging about 7 per cent and, under certain conditions, reaching even higher concentrations. This is true when a car is idling. For example, while waiting for the traffic control to change, drivers often use the accelerator several times, presumably to prevent their engines from stalling. This practice yields relatively high amounts of carbon monoxide and smoke.

The air we breathe is a remarkable diluent of the toxic gases that are constantly being emitted from various sources associated with our industrial life. Whether or not there is sufficient air to dilute the vast quantities of toxic automobile exhaust gas at certain congested areas in our large cities where stalled traffic is a common occurrence, is a problem that concerns us at the present time. That the amount of visible smoke and smell emanating from automobile exhausts is at times disagreeable is a fact not to be disputed; but whether or not the amount of exhaust gas in the air of our congested cities is such as to be inherently unhealthful is a question still to be decided.

In order to evaluate the extent of the hazard involved it is essential to determine the amount of carbon-monoxide gas present in the air of the most congested traffic areas of our cities. Such determinations made under traffic and atmospheric conditions should yield a fair index of the amount of toxic gas to which individuals are daily exposed in our streets, and an analysis of such data viewed in the light of our present day knowledge concerning the toxicity of carbon monoxide should go a long way toward answering the question as to whether or not a hazardous condition now prevails in our city streets. It is with such a study of the amount of carbon monoxide present in the atmosphere of our large cities that this paper is mainly concerned. Tests for carbon monoxide in automobile repair shops were also conducted and yielded some interesting results.

#### **Previous Studies**

Numerous tests have been conducted in recent years by various investigators in connection with the amount of carbon-monoxide gas existing in the atmosphere of garages and automobile repair shops. One of the most recent and extensive investigations of this sort was the one made by workers of the Bureau of Industrial Hygiene of the New York State Department of Labor (2). However, very few studies have been made concerning the amount of carbon-monoxide gas present in the outside air of our cities. In 1923 Henderson and Haggard (3) reported the conditions in the streets of New York and New Haven as regards atmospheric pollution by automobile exhaust

gas. These investigators made numerous tests under a great variety of atmospheric and traffic conditions. They concluded that a definite hazard existed in the congested areas of our large cities, and they recommended the vertical exhaust pipe discharging above the breathing level as a means of amelioration.

It appeared from this study that traffic patrolmen would be the persons most likely to be affected by exhaust gases in streets; and in 1926 Wilson, Gates, Owen, and Dawson (4) reported blood tests made on traffic patrolmen in Philadelphia. These workers examined the blood of traffic patrolmen after an ordinary eight-hour day's work, and found it to contain from 0 to 30 per cent carbon-monoxide hemoglobin, enough to be associated in some cases with mild subjective symptoms.

The only other study of carbon monoxide in city streets with which we are familiar is that made by workers of the Bureau of Sanitary Engineering of the Department of Health of the city of Chicago (5). In a report issued in 1926 these investigators presented results of tests made of the air in various parts of the city of Chicago. The highest amount of carbon monoxide reported by these workers was 0.36 part per 10,000 parts of air. From this study it was concluded that no hazard from carbon monoxide existed in the streets of Chicago.

#### Scope of Study

Early in 1927 one of the authors of this paper was engaged in certain work which necessitated visiting some of the large cities in this country, from Boston to San Francisco. It was thought that this trip, embracing all of the largest cities, offered a splendid opportunity to study the amount of carbon monoxide present in the most congested areas of these cities. Such a study would take in variations in traffic control and atmospheric changes which exist in our municipalities, and would yield an excellent index of the extent of atmospheric pollution by automobile exhaust gas.

Since the desideratum of these tests was to study conditions when the hazard was at a maximum, it was decided to include also automobile repair shops for indoor tests. In each city two repair shops, considered as representative of such establishments in the community, were selected for the tests. In addition to obtaining samples of air for the determination of carbon monoxide, a detailed study was made in each place concerning such influencing factors as artificial and natural ventilation, floor space and cubic content of each shop, number of automobiles handled in a day, number of workers exposed, and any other data bearing on this problem. In certain instances the blood of workers was examined in order to determine the degree of carbon-monoxide-hemoglobin saturation.

Likewise, for the street tests, it was desired to study the extreme existing conditions. Hence, with the aid of the police department of each city, two or three of the most congested traffic intersections were selected and tests made at the time when traffic was at a maximum, usually between the hours of 4 and 6 in the afternoon. Most of the street samples were taken at a time when traffic was stalled and cars were idling. These samples were taken as a rule at the breathing level of the pedestrian standing at the curb, and were obtained some 20 or 30 feet from the street intersection, in order to be where idling cars were numerous and also to avoid the open area at the street crossing. Where there was a police officer in the roadway of the intersection, samples were taken beside him in order to determine his exposure to the gas. In connection with the street tests, such factors as the distance between building lines, height of buildings, volume of automobile traffic, wind velocity, temperature, and relative humidity were also recorded. A few tests were made in tunnels used by vehicles and pedestrians, at taxicab stations, and (in one city) inside of auto busses and in offices and residential apartments opening on congested thoroughfares.

All samples were of the so-called "snap" or "grab" instantaneous type, and were taken by breaking the sealed tip of an evacuated 500-cubic-centimeter glass bulb. After obtaining the sample in this manner the broken capillary tip was temporarily sealed with sculptor's clay ("plasticine"), and upon arrival at the laboratory the bulb was sealed in a flame and stored away for subsequent analysis. It was felt that practically no loss of gas was possible in using this technique. Such instantaneous samples taken under congested traffic conditions necessarily yield higher results than would the slower continuous samples taken by other methods; but, since it was desired to study conditions when the exhaust gas in the air was at a maximum, this method of sampling appeared to us to be the most practicable. Our survey commenced in February and continued until late in June of the year 1927, so that all sorts of atmospheric conditions were encountered, thus yielding a fair test of atmospheric pollution by automobile exhaust gas.

#### Method of Analysis

The iodine pentoxide method was used for the analysis of our samples. This consists essentially in absorbing the other interfering substances in the air sample, oxidizing the carbon monoxide with iodine pentoxide, and determining the amount of iodine liberated. The apparatus used was similar to that of Seidell and Meserve (6), and differs only in the addition of a liquid-air condenser. In 1920

Teague (7), in working out a method for the determination of carbon monoxide in air contaminated with automobile exhaust gas, showed that the only effective means of removing unburned gasoline (which he found to be the only substance vitiating the result of the analysis of carbon monoxide by the iodine-pentoxide method) was in the use of liquid air ( $-190^{\circ}$  C.), which freezes out not only gasoline vapors but also water, carbon dioxide, and probably all of the unsaturated hydrocarbons.

Essentially the method is as follows: Suction is applied at one end of the absorption train in such a manner as to displace (by water) the sample of gas to be analyzed. The carbon monoxide, after passing through the various absorption bulbs and the liquid-air tube, is oxidized by iodine pentoxide at  $150^{\circ}$  C., and the liberated iodine is absorbed in a solution of potassium iodide. After the absorption train has been swept out by means of carbon-monoxide-free air, the total iodine obtained is titrated with N/500 sodium thiosulphate. The method is rather exacting, but under carefully controlled conditions it yields an accuracy of 0.1 part of carbon monoxide in 10,000 parts of air.

A number of analyses were made of artificial mixtures of air with known amounts of carbon monoxide or gasoline vapor, or both, in order to check the method. The mixtures of carbon monoxide were made by introducing a known amount of carbon monoxide from a gas burette into a known quantity of air. The carbon monoxide was prepared by the action of concentrated sulphuric acid on sodium formate, was purified by bubbling through a barium-hydroxide solution, and was subsequently stored over water. A saturated mixture of gasoline vapor with air was made by shaking 50 cubic centimeters of gasoline in a 2-liter bottle for five minutes. Definite volumes of this were taken with a gas burette after the air-gasoline mixture had stood for half an hour at room temperature. A series of analyses was made in order to test the efficiency and the necessity of using the liquid-air tube to remove unburnt gasoline vapor. Known mixtures of air, gasoline vapor, and carbon monoxide were analyzed, both with and without the liquid-air cooling tube in the train. The results of this series of tests are shown in Table 1.

This experiment demonstrated that it was necessary to remove any gasoline vapor in the determination, and that this removal was accomplished satisfactorily by the use of a liquid-air cooling tube. The determinations of carbon monoxide presented in Table 1 were lower than the theoretical in all cases except in the experiment where the gasoline vapor was not removed by the use of the liquid-air tube. These low results are probably due in part to the fact that the carbon monoxide was not strictly pure. The values which were obtained

on gasoline and carbon-monoxide-air mixtures when liquid air was used are in accord with those obtained in the absence of gasoline vapor.

TABLE 1.—*Showing effect of using the liquid-air condenser tube when determining carbon monoxide in air contaminated with gasoline vapor*

| Type of absorption train used | Cubic centimeters of air saturated with gasoline | Cubic centimeters of CO in air mixture calculated | Cubic centimeters of CO found | Difference in per cent |
|-------------------------------|--|---|-------------------------------|------------------------|
| Without liquid air tube.....  | 0  | 1.0   | 0.95                          | -5                     |
|                               | 0  | 1.0   | .93                           | -7                     |
|                               | 100  | 1.0   | 24.30                         | +2,430                 |
| With liquid air tube.....     | 0  | 1.0   | .92                           | -8                     |
|                               | 0  | 1.0   | .83                           | -17                    |
|                               | 100  | 0.0   | .00                           | 0                      |
|                               | 10   | 1.0   | .91                           | -9                     |
|                               | 10   | 1.0   | .81                           | -19                    |

CO-free air was used to make the mixtures in all cases.

A series of determinations was also made upon dilute mixtures of carbon monoxide and air. The deviations were less than 3 per cent in mixtures containing 1 to 6 parts CO per 10,000, and less than 10 per cent in those containing about 0.5 part per 10,000.

In all, 250 tests were made for carbon-monoxide gas in the air of streets, repair shops, and auto busses. Of this number, 141 were made in city streets, 102 in repair shops, and 7 in auto busses. In certain instances in which the analysis of a sample showed a relatively small amount of liberated iodine (corresponding to a low CO content), the contents of two or more sample tubes were combined for analysis in order to yield a higher relative degree of accuracy in the subsequent titration. In general, sampling tubes were "pooled" only in those cases in which the samples were obtained at the same location, and where the total amount found was low.

#### Street Tests

Table 2 summarizes all the tests for carbon monoxide made in the streets of 14 large cities. As has been stated, these tests were usually made at the most congested traffic intersections and at the time of day when traffic was at a maximum. Nearly all samples were taken at the breathing level of a pedestrian and at various points in the street where it may be necessary for a person to walk, such as at the curb near automobiles waiting for the signal to start, in the middle of the road, and near the traffic officer's position. It is felt that these samples represent high average exposures for pedestrians to automobile exhaust gas.

TABLE 2.—*Summary of carbon-monoxide tests made in the streets of 14 cities*

| City       | Sampling location | Number of tests made | Average CO in parts per 10,000 of air | Distance in feet between building lines | Average number of stories of buildings affecting air currents | Volume of automobile traffic, cars per hour | Wind velocity in miles per hour | Percent relative humidity | Remarks  |
|------------|-------------------|----------------------|---------------------------------------|---|---|---|---------------------------------|---------------------------|--|
| A          | 6                 | 5                    | 0.3                                   | 90                                      |   |   | 0.6                             | 40                        |  |
|            | 8                 | 4                    | .9                                    | 90                                      |   |   | 1.1                             | 71                        |  |
| B          | 10                | 6                    | 1.2                                   | 150                                     |   | 1,400                                       | .2                              | 67                        |  |
|            | 13                | 6                    | .5                                    | 70                                      |   | 2,400                                       | .3                              | 78                        |  |
| C          | 17                | 4                    | .8                                    | 84                                      |   | 1,720                                       | .4                              | 68                        |  |
|            | 19                | 4                    | .6                                    | 80                                      |   | 5,400                                       |                                 | 71                        |  |
|            | 20                | 4                    | 1.7                                   | 32                                      |   |   |                                 |                           |  |
| D          | 21                | 4                    | .9                                    | 50                                      |   | 700   | 2.5                             | 46                        |  |
|            | 24                | 4                    | .7                                    | 64                                      |   | 1,500                                       | .7                              | 48                        |  |
|            | 25                | 4                    | .4                                    | 64                                      |   | 900   | 1.1                             | 78                        |  |
| E          | 29                | 4                    | .3                                    | 60                                      |   | 1,500                                       | .4                              | 62                        |  |
|            | 31                | 5                    | .5                                    | 74                                      |   | 1,700                                       | .6                              | 53                        |  |
| F          | 39                | 4                    | 1.7                                   | 84                                      |   | 3,000                                       | .8                              | 39                        |  |
|            | 42                | 6                    | .5                                    | 70                                      |   | 1,320                                       |                                 | 57                        |  |
| G          | 46                | 4                    | .2                                    | 150                                     |   | 2,020                                       | .6                              | 26                        |  |
|            | 48                | 4                    | .6                                    | 125                                     |   | 1,960                                       |                                 | 42                        |  |
| H          | 53                | 3                    | .7                                    | 58                                      | 12  | 1,250                                       | 8.0                             | 55                        |  |
|            | 56                | 3                    | .4                                    | 60                                      | 3   | 1,300                                       | 0                               | 55                        |  |
|            | 57                | 2                    | 2.9                                   | 82                                      |   | 800   | 0                               | 42                        | Taxicab station, tunnellike inclosure.                                 |
| I          | 60                | 5                    | .3                                    | 125                                     | 6   | 2,480                                       | 4.0                             | 51                        |  |
|            | 61                | 6                    | 1.5                                   | 130                                     | 10  | 2,610                                       | 1.5                             | 42                        |  |
| Misc.      | 3                 | 1.1                  |                                       |   |   |   |                                 |                           | Taxicab station and office.  |
| J          | 65                | 6                    | .2                                    | 82                                      | 10  | 3,900                                       | 15.0                            | 69                        |  |
|            | 66                | 3                    | .8                                    | 115                                     | 2   | 1,370                                       | 5.0                             | 61                        |  |
| K          | 72                | 5                    | .6                                    | 112                                     | 8   | 1,576                                       | 2.0                             | 40                        |  |
|            | 73                | 4                    | 1.1                                   | 106                                     | 8   | 2,202                                       | 3.8                             | 30                        |  |
| L          | 76                | 5                    | 1.2                                   | 95                                      | 8   | 2,210                                       | 3.3                             | 59                        |  |
|            | 77                | 5                    | .5                                    | 73                                      | 5   | 1,720                                       | 1.7                             | 40                        |  |
| M          | 82                | 4                    | .7                                    | 105                                     | 3   | 1,990                                       | 4.2                             | 26                        |  |
|            | 83                | 3                    | .2                                    | 92                                      | 3   | 1,810                                       | 7.0                             | 48                        |  |
| N          | 90                | 3                    | .3                                    | 72                                      | 2   | 3,470                                       | 6.0                             | 55                        |  |
|            | 93                | 5                    | .3                                    | 110                                     | 2   | 2,780                                       | 2.0                             | 51                        |  |
| Misc.      | 4                 | .6                   |                                       |   |   |   |                                 |                           | Samples taken from rear of truck while in motion through city streets. |
| Totals...  | 33                | 141                  | 25.0                                  | 754                                     | 82  | 57,078                                      | 72.8                            | 1,570                     |  |
| Average... | 2.4               | 4.3                  | .8                                    | 85                                      | 5.9   | 2,038                                       | 2.7                             | 52.3                      |  |

Table 2 presents the number of tests made at each sampling location and the average amount of carbon monoxide, in parts per 10,000 parts of air, found at each sampling spot, the distance between building lines, height of neighboring buildings, the volume of traffic, wind velocity, temperature, and relative humidity. It is to be noted that attempts to find a relation between carbon-monoxide concentration and such factors as wind velocity and traffic volume proved fruitless, though the lowest concentration was found at the point of highest wind velocity, and another low result was obtained in the widest thoroughfare. Possibly a larger body of data might reveal more definite correlations; but, apparently, one or two poorly adjusted carburetors are likely to produce high contamination in spite of the benefits derived from a strong breeze and a clear day.

The average carbon-monoxide concentration at 30 open street locations in 14 cities was found to be 0.65 parts per 10,000. The minimum average amount at any location was 0.2 and the maximum was 1.7 parts per 10,000. A result as high as the maximum for street air was obtained in a vehicular tunnel ventilated by fans, the average amount of carbon monoxide here being 1.7 parts per 10,000. This condition is partly due to the fact that at one of the tunnel exits there is a traffic signal which delays some of the cars for a period as long as 30 seconds; this results in a long line of halted automobiles half the length of the tunnel. This condition could be considerably minimized by providing for freer exit from the tunnel or by controlling the idling of engines in the tunnel during the period when cars are not in motion. At another location we obtained a still higher concentration of carbon monoxide. Our analyses showed that in this location, which is an inclosed tunnellike taxicab stand at a railway station, there existed 2.9 parts of carbon monoxide per 10,000 parts of air. Taxicabs are usually not provided with self-starters, so that once the motors are started it is customary in some instances not to shut them off during the entire working day. This practice obviously increases the amount of carbon-monoxide gas in the air of such places as cab stands at our large railway terminals.

In one city samples were taken in a narrow residential street where cars are continually passing, and on one floor above the sidewalk in an apartment opening on this street, and in an office located on the fourth floor of a building overlooking the congested traffic area. The sample taken in the narrow street showed 0.2 parts per 10,000 of carbon monoxide and the sample taken in the room one story above showed 0.4 parts per 10,000. In the office room on the fourth floor of a building located in the business area of the city 0.3 parts per 10,000 of carbon monoxide was found.

#### Repair Shop Tests

In Table 3 is presented a summary of the tests made in 27 automobile repair shops in 14 cities. In all, 102 determinations were made in these shops. The average amount of carbon monoxide found was 2.1 parts per 10,000 parts of air. Additional data included such information as area of available openings in the room that might serve as a means of natural ventilation, area of ventilating space actually open at the time the tests were conducted, number of automobiles entering and leaving in a day, number of workers exposed, and the presence of artificial ventilation in the workroom.

The data presented in Table 3 show that the highest average amount of carbon-monoxide gas found in any repair shop was 11 parts per 10,000, while the minimum average was only 0.1 part per 10,000. The ratio of available openings to floor space averaged 0.07, and about 43

per cent of the available openings were in use at the time these tests were made. The average number of cars handled was 80 and the average number of persons exposed was 23. Practically all the shops visited depended on natural ventilation to remove the toxic gases produced by automobiles.

TABLE 3.—*Summary of carbon-monoxide tests made in automobile repair shops of 14 cities*

| City      | Repair shop | Number of tests made | Average CO in parts per 10,000 of air | Ratio of available openings to floor space | Ratio of actual openings to floor space | Number of automobiles handled per day | Number of workers exposed | Principal ventilation | Remarks   |
|-----------|-------------|----------------------|---------------------------------------|--|---|---------------------------------------|---------------------------|-----------------------|---|
| A         | 5           | 4                    | 0.1                                   | 0.11                                       | 0.04                                    | 25                                    | 7                         | Natural.....          |   |
|           | 7           | 4                    | 1.2                                   | .08  | .01                                     | 120                                   | 4                         | do.....               |   |
|           | 9           | 4                    | .5                                    | .05  | .03                                     | 100                                   | 23                        | do.....               |   |
| B         | 11          | 3                    | .1                                    | .15  | .11                                     | 12                                    | 5                         | do.....               |   |
|           | 15          | 4                    | 2.3                                   | .07  | .03                                     | 15                                    | 12                        | do.....               |   |
| C         | 16          | 4                    | .6                                    | .04  | .03                                     | 40                                    | 30                        | Mechanical.....       |   |
|           |             |                      |                                       |  |   |                                       |                           |                       | Duct system of exhaust ventilation.   |
| D         | 23          | 4                    | 1.2                                   | .04  | .02                                     | 150                                   | 5                         | Natural.....          |   |
| E         | 28          | 4                    | 3.3                                   | .22  | .03                                     | 50                                    | 15                        | do.....               |   |
|           | 30          | 4                    | 11.0                                  | .10  | .012                                    | 35                                    | 10                        | do.....               |   |
| F         | 40          | 5                    | 4.1                                   | .03  | .02                                     | 115                                   | 330                       | do.....               |   |
|           | 41          | 4                    | 1.8                                   | .21  | .00                                     | 15                                    | 8                         | do.....               | Flexible pipes (leaking) attached to muffler outlets.                                       |
| G         | 43          | 3                    | 1.0                                   | .04  | .014                                    | 130                                   | 35                        | do.....               |   |
|           | 45          | 3                    | 1.9                                   | .05  | .02                                     | 50                                    | 18                        | do.....               |   |
| H         | 52          | 4                    | 2.7                                   | .06  | .02                                     | 35                                    | 37                        | do.....               |   |
|           | 55          | 4                    | .7                                    | .07  | .05                                     | 80                                    | 15                        | do.....               |   |
| I         | 58          | 4                    | .6                                    | .01  | .004                                    | 30                                    | 52                        | do.....               |   |
|           | 59          | 2                    | .7                                    | .02  | .006                                    | 40                                    | 30                        | do.....               |   |
| J         | 63          | 4                    | .9                                    | .03  | .03                                     | 45                                    | 75                        | do.....               |   |
|           | 68          | 2                    | .2                                    | .05  | .04                                     | 7                                     | 46                        | do.....               |   |
| K         | 70          | 4                    | .6                                    | .01  | .009                                    | 100                                   | 50                        | do.....               |   |
|           | 71          | 6                    | 2.6                                   |  |   | 600                                   | 200                       | Mechanical.....       | Ducts exhausting only 100 cubic feet per minute, near the muffler outlets. Ozonator in use. |
| L         | 78          | 5                    | 8.3                                   | .04  | .03                                     | 25                                    | 5                         | Natural.....          |   |
|           | 79          | 5                    | 4.3                                   | .07  | .05                                     | 20                                    | 10                        | do.....               |   |
| M         | 86          | 3                    | 1.0                                   | .18  | .13                                     | 35                                    | 15                        | do.....               |   |
|           | 87          | 4                    | .5                                    | .01  | .013                                    | 100                                   | 4                         | do.....               |   |
| N         | 91          | 3                    | .7                                    | .04  | .03                                     | 100                                   | 30                        | do.....               |   |
|           | 92          | 2                    | 2.4                                   | .06  | .05                                     | 90                                    | 50                        | do.....               | Flexible pipes attached to muffler outlets.   |
| Totals... | 27          | 102                  | 35.6                                  | 1.84                                       | .80                                     | 2,144                                 | 617                       |                       |   |
| Average.. | 2           | 3.8                  | 2.1                                   | .07  | .03                                     | 80                                    | 23                        |                       |   |

All attempts to obtain a correlation between the amount of carbon monoxide and the ventilation factors, such as area of openings, method of ventilation, and number of cars handled, failed to give any decisive results. We are convinced that the idling of a car at the time of sampling produces such a large amount of carbon monoxide as to destroy all the relationships which might be assumed to exist between ventilation and gas content of the garage or repair shop. In fact, from our observations during this study it is felt that no matter what type of ventilation is in use in a repair shop, the carbon-monoxide concentration will be excessive so long as motors are allowed to discharge their exhaust indoors for any considerable

length of time. It is a practice in most shops to test carburetors indoors, a practice that is obviously productive of much exhaust gas. It seems that this gas could be eliminated effectively by relatively simple means. One such simple system was found in use in a repair shop in one of the cities visited. Cars entering the shop were obliged to shut off the motor within 30 seconds after admission. Whenever any carburetor adjusting was to be done, a flexible hose was firmly attached to the exhaust pipe. This hose extended up to the ceiling and was connected to a pipe leading to a ventilator on the roof. With such an arrangement the hot gases pass out through the ventilator.

To test the efficiency of such a system, air samples were taken as follows: An automobile had been placed on the testing block for carburetor test, with its exhaust pipe attached to the flexible hose connection which led to the ventilator in the roof. Three samples taken at the breathing level of the observer immediately after the testing of the engine averaged 0.7 parts of CO in 10,000 parts of air. Five minutes after this test the same automobile engine was allowed to idle without the hose connection to the exhaust pipe, the gases coming out into the shop in a horizontal stream. Samples taken under these conditions averaged 2.0 parts of CO in 10,000 parts of air for periods of engine operation corresponding to those of the first test. This difference in CO content of 1.3 parts per 10,000 is an indication of the efficiency of the simple and inexpensive system of exhaust gas removal described above. It is often argued that such a system would not be practicable in shops where most of the gas comes from cars in motion. This fact may be true in commercial garages and storage places, but was not found to be so in repair shops. In nearly all instances an automobile once brought into the shop remains in one location until repairs have been completed. It is our belief that most of the gas is produced during carburetor testing when the car is not in motion, and at such a time the flexible pipe connection attached to the exhaust should serve to conduct all noxious gases outside the repair room.

In several cities, information was requested by repair-shop proprietors concerning the advisability of the use of an ozone apparatus for eliminating carbon-monoxide gas. Such an apparatus has been investigated by the Bureau of Industrial Hygiene of New York (8), and the conclusion reached by the investigators of that bureau is that ozone does not oxidize carbon-monoxide gas to any appreciable extent. The effects of the ozonator on carbon monoxide were first tested by the New York Bureau of Industrial Hygiene in a gas-tight chamber, and, later, further tests were made in service stations where all determinations showed carbon monoxide to the extent of 3 or 4 parts in 10,000. In an automobile plant visited by us an ozonator was in use in a portion of a large one-story building devoted to

the final assembling and testing of automobiles. As many as 10 machines were tested at one time. An attempt was made to remove some of the exhaust gases by means of local ducts placed within a few inches of the exhaust pipe of each machine and connected with a low-capacity exhaust fan. These ducts were rectangular, about one-third of a square foot in cross-sectional area and removed only about 100 cubic feet of air per minute. The design and location of the exhaust ducts were such as to allow most of the gas to escape into the air of the room. Six tests for carbon-monoxide gas made in the vicinity of the ozonator and test racks showed an average of 2.6 parts per 10,000 parts of air. Blood tests, using the Sayers-Yant pyrotannic acid method (9) were made on five men employed in this room. Three of the men had been working at the test racks for about three hours, and an analysis of their blood taken while at work showed 20, 25, and 20 per cent carbon-monoxide-hemoglobin saturation. A test on the blood of one man working 100 yards away from the test rack showed 15 per cent carbon-monoxide hemoglobin, and the blood of another person employed on final assembly work 50 feet away from the test rack showed 25 per cent carbon-monoxide hemoglobin. This amount of carbon-monoxide hemoglobin is associated with mild subjective symptoms. Possibly the only effect of the use of the ozonator is a psychological one.

#### Autobus Tests

In two cities, tests were made inside autobusses. Nearly all such conveyances are heated during cold weather by allowing the hot exhaust gases to pass through pipes located on the floor alongside the walls of the car. In case there are leaks in these pipes some exhaust gas will find its way into the bus. The several busses in which tests were made by us showed the presence of exhaust gas by their odor, which in an overheated bus is at times disagreeable. Practically all these busses depend on small openings in the roof or sides of the car for natural ventilation. In seven tests made in six different autobusses, the maximum amount found was 1.0 part of carbon monoxide per 10,000 parts of air, the minimum was 0.1 part, and the average of the seven tests was 0.5 part in 10,000. It was noted that some of the busses at the time these tests were made were overheated, a condition which does not promote comfort and which may increase the symptoms of mild carbon-monoxide poisoning.

#### Discussion of Results

In Table 4 the results of all our tests for carbon monoxide in streets, repair shops, and autobusses of 14 large cities are summarized in such a manner as to show the percentage distribution of samples according to the concentration of carbon monoxide found. It is apparent that

only 24 per cent of the street samples showed as much as 1 part of carbon monoxide per 10,000 parts of air, whereas 59 per cent of the repair shop samples fall into that group. Of the seven autobus samples only one contained as much as 1 part of carbon monoxide in 10,000 (1.0). Of the 34 street samples (24 per cent of the total street samples) which contained 1 part or more of carbon monoxide in 10,000, 32 (23 per cent of total) had less than 2 parts and 2 (about 1 per cent) contained 2 parts or more of carbon monoxide in 10,000 parts of air. These highest concentrations, however, were obtained in a taxicab station at a railway terminal, and present an unusual condition. It must be noted also, that our street samples tend to represent the worst conditions in streets as regards carbon-monoxide content, since they were obtained in nearly all instances at the most congested traffic centers and at the busiest hours of the day, when the volume of traffic was at its height. The samples were, it should also be noted, of the instantaneous type and taken, as a rule, when traffic was halted and engines were idling, a condition associated with the maximum production of exhaust gas. The autobus samples show a still more favorable result in that practically all of them contained less than 0.01 per cent of carbon monoxide.

On the other hand, the samples taken in the 27 repair shops of the 14 cities show a condition far from favorable. More than half of the samples (59 per cent) contained more than 1 part of carbon monoxide in 10,000, and 18 per cent were over 4 parts in 10,000, an amount considered as decidedly inimical to health. In fact, several determinations in repair shops showed 10 or more parts of carbon monoxide in 10,000. These high results were usually obtained in those repair shops of small floor space, low ceilings, and very small openings to the outdoor air.

TABLE 4.—*Distribution of carbon-monoxide samples obtained in city streets, repair shops, and autobusses*

| Carbon monoxide in parts per 10,000 | Street samples    |                     | Repair shop samples |                     | Autobus samples   |                     |
|-------------------------------------|-------------------|---------------------|---------------------|---------------------|-------------------|---------------------|
|                                     | Number of samples | Per cent of samples | Number of samples   | Per cent of samples | Number of samples | Per cent of samples |
| 0.1-0.9.....                        | 107               | 76                  | 42                  | 41                  | 6                 | 86                  |
| 1.0-1.9.....                        | 32                | 23                  | 21                  | 21                  | 1                 | 14                  |
| 2.0-3.9.....                        | 2                 | 1                   | 20                  | 20                  | 0                 | 0                   |
| 4.0+.....                           | 0                 | 0                   | 19                  | 18                  | 0                 | 0                   |
| Total.....                          | 141               | 100                 | 102                 | 100                 | 7                 | 100                 |

At the present time the accepted criterion concerning the safe limits of carbon-monoxide concentration in air is that advanced by Henderson and his colleagues (10) in 1921 as a result of their work on the physiological effects of automobile exhaust gas for the New York

and New Jersey State Bridge and Tunnel Commission. These workers stated that for the tunnel itself a standard allowing a maximum of 4 parts of carbon monoxide in 10,000 of air would be permissible provided the transit through the tunnel would take less than one hour. In summarizing their findings, Doctor Henderson and his collaborators formulated the following general rule: When the time is measured in hours and the concentration of carbon monoxide is expressed in parts per 10,000 parts of air, the physiologic effects may be defined by the equations:

- Time  $\times$  concentration = 3, no perceptible effect.
- Time  $\times$  concentration = 6, a just perceptible effect.
- Time  $\times$  concentration = 9, headache and nausea.
- Time  $\times$  concentration = 15, dangerous.

This work of Henderson's was subsequently confirmed by Sayers, Meriwether, and Yant in 1922 (11). These workers studied the effect of long exposure to low concentrations of carbon monoxide, the effect of strenuous exercise, and the effect of high temperature and humidity in low concentrations. Sayers and his colleagues showed that when a subject exercised strenuously for one hour in an atmosphere containing  $2\frac{1}{2}$  parts of carbon monoxide in 10,000 the immediate symptoms of carbon-monoxide poisoning were moderate and the after effects mild to moderate. None of the subjects showed any permanent effects after repeated exposures to carbon monoxide.

From the foregoing discussion of the amount of carbon monoxide that may be tolerated with impunity it is quite obvious that our findings concerning the conditions in the streets of large cities do not reveal a serious condition. Under ordinary circumstances a pedestrian would be exposed to the maximum condition only for a brief period, and even then the concentration of carbon-monoxide gas he would be forced to inhale would be rather low, our findings showing an average carbon-monoxide content of 0.8 part in 10,000 for 141 samples taken when the possible hazard was at a maximum. The same criterion applied to autobus samples shows that there ordinarily exists no hazard due to the contamination of the atmosphere inside such conveyances. It is conceivable, however, that the air of busses may be subject to an even greater range in carbon-monoxide content than that of streets or large garages, since a single badly leaking exhaust pipe discharging continuously into the interior of a bus could produce relatively high concentration. The only person who may be considered on the border-line in connection with outdoor poisoning from automobile exhaust gas is the traffic officer, who is obliged to remain at his post for about eight hours, during two hours of which period the exposure reaches a maximum. That there is a possibility of some grounds for the belief that traffic officers are affected is brought out by Wilson and others (4) who tested the blood of patrolmen after

an eight-hour day's work and found that the maximum carbon-monoxide-hemoglobin content was 30 per cent, a condition associated with mild subjective symptoms. It would be interesting to make a further study into the physiological effects experienced by traffic officers at congested intersections, and, in case the findings warranted action, the time of duty at points of continual congestion might be diminished in order to minimize the hazard.

Applying the same standards to repair shops it is apparent that a real hazard exists in such establishments, as revealed by the results of 102 samples obtained in our study. Only 41 per cent of these samples showed a carbon-monoxide content less than 1 part in 10,000. Workers of the United States Bureau of Mines (13) recently reported carbon-monoxide tests made with a recording instrument in two garages. This carbon-monoxide recorder showed that the average concentration in any one day in one garage never exceeded 1 part per 10,000 and the maximum average in another garage for one day reached 1.6 parts per 10,000. However, at times the carbon-monoxide content in these garages exceeded 8.9 parts per 10,000, and the maximum average for any one hour was found to be 4.3 parts per 10,000. Had these tests been made during cold weather, no doubt the carbon monoxide would have reached higher concentrations. Similar conditions were found by the workers of the Bureau of Industrial Hygiene of New York in some of their tests in garages and repair shops (2), (12). Although the average conditions found by these workers did not show as high an amount of carbon monoxide in the atmosphere of the repair shops visited by them as that obtained in the present investigation, yet as a result of their research the investigators of the New York Bureau of Industrial Hygiene concluded that the only safe method is ventilation, and that the carbon monoxide should not exceed 0.5 part in 10,000 volumes of air. In connection with regulations governing ventilation of public garages the municipal code (section 2196) of the city of Chicago requires that the carbon-monoxide content should not exceed 2 parts per 10,000 parts of air.

The average of 102 determinations of the carbon monoxide in the atmosphere of 27 repair shops investigated in the present survey showed 2.1 parts of this gas in 10,000 volumes of air. The possibility of such an amount of carbon monoxide being inhaled by an active worker over a period of eight hours reveals a serious condition in automobile repair shops. Our experience has been that even with a well-designed system of ventilation in use the atmosphere of a repair shop will show as much as 0.6 part of carbon monoxide in 10,000 parts of air. It is our belief that no automobile motor should be permitted to run longer than 30 seconds in any inclosed garage except when being driven in or out of the garage. Testing of car-

buretors and any other operation of an engine indoors should be done only when some means has been taken to remove the exhaust gas directly to the outer atmosphere, possibly by means of a flexible hose connection to the exhaust pipe, as described earlier in this paper.

#### Summary

This survey was undertaken to ascertain whether or not a health hazard from carbon monoxide existed in the streets of our large cities, inside of autobusses, and in repair shops. Fourteen of the largest cities in the country were visited, having a combined population of over 19,000,000, and 250 samples of air were obtained for carbon-monoxide analysis. These samples were analyzed by the iodine-pentoxide method, using a liquid-air cooling tube which was shown to be necessary in order to eliminate gasoline vapor, a substance which tends to vitiate the results of the analysis. Our street samples were taken in such a manner as to approach the most congested conditions that may exist at a busy traffic intersection. Hence, it is felt that these results indicate the maximum hazard from automobile exhaust gas that may exist to-day in our metropolitan thoroughfares. The average of 141 tests made in city streets at peak hours of traffic showed a contamination of 0.8 part of carbon monoxide per 10,000 parts of air. Only 24 per cent of all the street samples had more than 1 part of carbon monoxide in 10,000 of air, and in only one location, a covered passageway, was there as much as 2 parts per 10,000. Samples taken inside of autobusses yielded even lower concentrations of carbon-monoxide gas. The figures for street air, when viewed in the light of present day standards of exposure to carbon monoxide, do not reveal the existence of a health hazard from this source in our city streets. The only individual who may possibly be exposed to a health hazard from inhaling street air containing automobile exhaust gas is the traffic officer. This potential hazard may be minimized by diminishing the duration of exposure at the most congested traffic stations.

Of the 102 tests made in 27 garages in the 14 cities visited, the average carbon-monoxide content was found to be 2.1 parts in 10,000. More than half of the samples (59 per cent) contained over 1 part of carbon monoxide, and 18 per cent of all the samples contained over 4 parts of this gas in 10,000 parts of air. These results for repair shops show a dangerous condition that demands the serious consideration of those concerned. This hazard in repair shops may be reduced to a minimum by not allowing the motors of automobiles to run longer than 30 seconds unless the car is in necessary motion or the exhaust is connected to the outside air by a direct air-tight outlet

of ample caliber. Without such outlet no automobile engine should be allowed to run indoors, except to reach its berth or to leave by the shortest route. All of these samples were taken in garages of considerable size. The great danger to life is unquestionably in the small private garage containing one or two cars. Under any circumstances the discharge of an automobile exhaust into a roofed inclosure should be regarded as a hazardous act.

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**COURT DECISIONS RELATING TO PUBLIC HEALTH**

*Nuisance from overflow of town septic tank enjoined.*—(Oklahoma Supreme Court; *Town of Jennings v. Pappenfuss*, 263 P. 456; decided January 24, 1928.) An action was brought to enjoin a town from maintaining a nuisance and to compel it to abate the same. The plaintiff alleged that the overflow upon her land from a septic tank of the town sewer constituted a nuisance, the odor and stench being of such extent that it was practically impossible to live upon her farm. The trial court found that the town had been maintaining a nuisance by permitting the overflow from the septic tank to flow into a ditch and over and upon the plaintiff's land, and adjudged that a permanent injunction be granted the plaintiff, enjoining the defendant from maintaining the nuisance, and that defendant proceed at once to abate the nuisance. On appeal the judgment of the lower court was affirmed by the supreme court.

*Revocation of license for manufacture and bottling of soft drinks upheld.*—(Maine Supreme Judicial Court; *Appeal of Bornstein*, 140 A. 194; decided January 26, 1928.) Chapter 155, Laws of 1925, provided for the licensing, by the commissioner of agriculture, of any person, firm, or corporation manufacturing or bottling for sale at wholesale any drink product or other nonalcoholic beverage within the State, and also empowered the commissioner to revoke or suspend any license whenever any provisions of the act had been violated. The act also provided that "Whenever artificial colors or flavors are used in the manufacture of drink products or other nonalcoholic beverages, the bottle or other container shall be distinctly labeled or crowned 'Artificially colored and flavored.'" The appellant had been licensed under the act and, after notice and hearing, the commissioner revoked such license on the ground that the appellant had bottled a beverage, containing artificial color, in bottles or containers not labeled or crowned "Artificially colored and flavored." On appeal before the supreme court it was urged that there was a violation of the appellant's constitutional guaranties in that he was deprived of a property right without due process of law, but the court in upholding the revocation said:

The constitutional questions argued are not open to the appellant in this proceeding. The single issue here is revocation of the license granted by the commissioner. In accepting the license and acting under it, the appellant consented to all conditions imposed thereby. He took it subject to such conditions as the legislature had seen fit to impose. Such license is in no sense a contract or property, immunity, or privilege. *State v. Cote*, 122 Me. 450, 120 A. 538; *Burgess v. Brockton*, 235 Mass., 95, 126 N. E. 456; *Com. v. Kinsley*, 133 Mass. 578; 17 R. C. L. 554. The requirements of the act as to labeling or crowning bottles and containers must be read into the license as a condition to which the appellant consented. *State v. Cote*, supra. If the validity of the act in its branding requirements is to be tested, it must be in another and different proceeding.

## PUBLIC HEALTH ENGINEERING ABSTRACTS

**Garbage Disposal at Highlands, N. J.** Anon. *The American City*, vol. 38, No. 1, January, 1928, pp. 147-148. (Abstract by C. R. Cox.)

The population of Highlands varies from 2,000 in winter to about 10,000 in summer. A United States standard incinerator was installed in June, 1927, with a guaranteed capacity per 24 hours of 24 tons of refuse consisting of 65 per cent garbage, with moisture content less than 70 per cent, and 35 per cent rubbish without added fuel. Tests indicated the capacity to be 72 tons per 24 hours and that the temperature in the combustion chamber was 2,000° F. Three charging openings are used, one for rubbish onto the firing hearth, one for wet garbage onto the drying grates, and one for the carcasses of animals, which are placed in the bottom of the combustion chamber. Collections from August 1 to September 10 amounted to 503 tons of refuse, which was incinerated at the following costs: Labor, \$318.35; wood, \$30; coal, \$42; electric power, \$14, or a total of \$404.35, or \$0.803 per ton. The cost of collection was as follows: Labor, \$891, and gas and oil, \$86.40, or an average of \$1.90 per ton. About \$270 was saved during the 36-day period over former cost of disposal on a sanitary dump where lime and earth cover was used to prevent odors.

**A New Diluent for Paris Green.** P. A. Dalal and E. E. Madon. *Indian Medical Gazette*, vol. 62, No. 10, October, 1927, pp. 554-555. (Abstract by W. A. Hardenberg.)

One of the problems in anopheline control in Bombay has been "sprinkler tanks," which are elevated tanks provided for automatic gravity fire service. These tanks mostly contain clean water, are generally 30 to 60 feet in width and length and 6 feet deep, and even when covered are not mosquito-proof. There are also other cisterns, usually containing clean water, which are used for a variety of purposes. Pyrethrum-base powders were not effective. No satisfactory diluent for Paris green was available. Cork powder is effective but too expensive; sawdust sinks after a short time; fine road dust sinks too quickly and does not withstand agitation or wind action; flue dust from boiler flues was quite satisfactory; but French chalk, which is finely powdered magnesium silicate, proved best. This is readily obtainable in India in smooth hard pieces, which can be ground in a mortar. To treat a tank 32 by 16 by 6 feet deep, 40 grains of Paris green and 8 ounces of French chalk were used. Though a strong wind was blowing, a satisfactory film was maintained and the treatment proved effective. This mixture is considered ideal for use on small cisterns.

**Malaria and Malaria Control in Turkey (Malaria und Malariabekämpfung in der Tuerkei).** E. Martini. Leaflet of 2 pages, Hamburg, Germany. (Abstract by A. L. Dopmeyer.)

Malaria is a disease of very great importance in Turkey. Although there is very little malaria in Constantinople, there is a great deal of it in the district of Anatolia. All sections, however, are said to suffer heavily from the disease, and in the warm lowlands of the west and south the severe forms of the disease are found.

The climate of the country is variable. The elevated plateaus are dry, cold in winter and very warm in summer. The northern part has a damp, cold climate and the south has extremely warm summers and mild winters. In contrast to the usual three species of *Anopheles* mosquitoes found in Europe north of the Alps, there are eight distinct species here. In the mountainous sections the *Anopheles superpictus* is abundant, and in other sections where water is plentiful, the streams serve as breeding places for *Anopheles elutus* and *maculipennis*.

In 1925 the new government took an active interest in malaria control and formed so-called malaria missions consisting of a chief medical officer and subordi-

nate medical and other personnel. Malaria stations were established for the treatment of cases in order to check the spread of infection. The first mission was started in Angora and later ones were established at other points; and it is significant to note that, according to statistics compiled, the malaria reduction depends in large degree on the length of time the mission has been operating.

The success of the work at Angora is evidenced by the fact that a few years ago it was thought that it might be necessary to move the capital from that city on account of malaria, whereas the disease in that city to-day is practically non-existent.

The total cost of malaria control work in Angora for 1926, with a population of 30,000, was \$35,700 or \$1.19 per capita.

**Report of an Investigation of a Malaria Epidemic in Solo, 1926.** S. L. Brug and Dr. E. W. Walch. *Mededeelingen Dienst d. Volksgezondheid in Nederlandsch-Indie*, Foreign Edition, 1927. Part 3, pp. 531-579. (Abstract by H. R. Crohurst.)

This article contains a description of conditions in Solo, the third largest town of the Netherland Indies, during the malarial epidemic of 1926. There are presented data covering the hydrographic conditions of the town, history of malaria at Solo, area involved, and the center of the 1926 epidemic, progress of the epidemic, the examination of *Anopheles*, the distribution of quinine, the probable cause of the epidemic, and future control measures.

On the evidence of indirect data it was supposed that the vectors of the epidemic came chiefly from the bed of a storm-water canal, which in the dry season shows numerous isolated pools. Owing to the rains setting in so late in 1925 this canal had not been flushed during an abnormally long time. With this opinion corresponded the fact that the heaviest affected native villages lay precisely where the bed of the canal showed the greatest number of pools.

The direct proof regarding the storm-water canal could not be given, as it was only once dry during a sufficient number of days during the investigation to be examined for the presence of larvae. At that time it contained almost exclusively larvae of *M. vaga*, which does not exclude the fact that before this time other species may have bred there.

Only one *Anopheles* was found infected, namely, an *M. rossi*. The larvae of this species were found only in the northern part of the town, but there, in small numbers, and in breeding places of a very different nature. Other potential carriers found during the investigation were somewhat larger numbers of *M. aconita* and *N. fuliginosus*.

The Government distributed without charge, during the epidemic, 420,000 tabloids of 0.2 gram of bisulphate of quinine. Prophylaxis was applied especially in the schools.

It is recommended that the condition of the storm-water canal be observed in the future, as it is believed that the river Pepe carries too little water in the dry season to effect a proper flushing of the canal precisely at the time that it is most necessary.

**Report of Some Experiments on the Efficiency as Insecticides of "Flit," "Rids," and Some Other Preparations Made at the Medical Laboratory at Weltevreden.** S. L. Brug and Dr. J. Van Slooten. *Mededeelingen Dienst d. Volksgezondheid in Nederlandsch-Indie*, Foreign Edition, 1927. Part 3, pp. 524-530. (Abstract by H. R. Crohurst.)

The authors describe the effects on mosquitoes, flies, cockroaches, and bed-bugs, by spraying with various insecticides, "flit," commercial "rids," and "rids" prepared in the laboratory with kerosene, carbon tetrachloride, methyl salicylate, and various mixtures of each.

The authors conclude: "Flit kills such insects as flies and mosquitoes very readily. With commercial 'Rids,' and with 'Rids' prepared in the medical

laboratory nearly the same results were obtained. Pure kerosene is certainly considered somewhat inferior to these. There is no objection to omitting the methyl salicylate from the 'Rids' formula, the addition of a quantity of carbon tetrachloride of 2 parts to 100 parts of kerosene being sufficient to guarantee a good effect. One gets thereby a simpler and cheaper preparation with the same effects. On account of its irritating effects on the skin, conjunctiva, and nasal mucosa, and on account of producing stains, 'Flit' is less recommendable. Unless one can spray the insects repeatedly, the effect on cockroaches is doubtful. Since the penetrating power of an insecticide fluid applied by means of a spray is not sufficient to reach bedbugs in all their hiding places, all these preparations are of little importance in the destruction of such vermin."

**Italy's Campaign Against Malaria.** Arturo Castiglioni. *British Medical Journal*, No. 3475, August 13, 1927, pp. 278-289. (Abstract by R. E. Tarbett.)

From ancient times malaria has been a grave problem in the area now comprising the Kingdom of Italy. Archaeologists have shown that the Etruscans attempted to drain the swamps and marsh land and later the Romans actually eradicated these areas in the Campagna Romana. After the fall of the Roman Empire this area again became malarious.

Grassi, Celli, Marchiafara, and Bignami collaborated with Ross in the study of the malaria parasite and mode of transmission of malaria. They also inaugurated the legislation on the supply of quinine to the malarious regions. Quinine is prepared by the State laboratories and sold to certain public retailers. All profits are placed in a special fund for carrying on malaria control work. Malaria is classified as an occupational disease and carries the right to indemnity.

The usual methods employed in malaria control are carried on. The author places considerable stress on the raising of cattle in the malarious regions and the development of nonhuman-stinging *Anopheles*.

From 1887-1902 there was an average of 15,000 deaths per annum; 1903-5, 8,000 deaths per annum; and a decline to 2,000 in 1914. An increase reaching 11,487 in 1918 occurred during the war period. Since that time a rapid decrease has occurred, the deaths in 1923 being 3,000.

**The Water Supply Project of the Mahoning Valley Sanitary District.** W. H. Dittoe. *Journal American Water Works Association*, vol. 18, No. 6, December, 1927, pp. 655-663. (Abstract by M. F. Trice.)

"The purpose of this paper is to explain briefly the conditions leading to the establishment of the sanitary district, the provisions of the sanitary district act controlling the procedures followed, and the general features of the recommended plan." The Mahoning River, draining an area of approximately 1,000 square miles, is grossly polluted by sewage and industrial wastes, and yet serves as a source of public water supply for Warren, Niles, and Youngstown, the three principal cities of the valley, each of which operates a filtration plant. In spite of resourceful control these plants deliver to consumers a highly unsatisfactory water. Upon action by the city councils of Niles and Youngstown, and application to the court of common pleas of Mahoning County, which, after due hearing of the court on February 2, 1926, "ordered the formation of a district for the purpose of providing a satisfactory public water supply for the two municipalities."

**Provisions of law.**—The sanitary district act of Ohio permits two or more political subdivisions to organize for the following purposes: (a) Improved water supply, and (b) improved sewage disposal. This district was organized solely for improving the water supply, and therefore sewage disposal is not discussed. The court appoints a board of directors which supervises the work. The Ohio law requires the board to prepare plans for the improvements. The board allows hear-

ings relative to the plans, estimates costs, assesses the political units benefited proportionately, issues bonds for the execution of the plan, is empowered to proceed with construction either directly or by contract, and after completion of the project supervises maintenance and operation.

*The plan for the district water supply.*—The essential features of the plan include (1) the Meander Creek Reservoir, formed by the construction of the Mineral Ridge Dam; (2) purification and pumping works located immediately below dam; (3) pipe lines for delivery of the purified supply to the two cities; (4) a covered distributing reservoir in Youngstown and a steel standpipe in Niles, for reserve storage of water on the distributing systems.

The cost of execution of this plan is estimated at \$9,150,000, made up of the following principal elements:

|  |       |             |
|--|-------|-------------|
| Dam and reservoir                                    | ----- | \$3,781,960 |
| Purification and pumping works                       | ----- | 2,310,030   |
| Pipe lines and distributing reservoir for Youngstown | ----- | 2,661,600   |
| Pipe lines and standpipe for Niles                   | ----- | 396,410     |

The principal features of the above elements are discussed broadly, as, for instance, the dimensions and size of the dam, capacity and yield of the reservoir and the opportunity for future increase of the supply, the highway changes and resulting bridge construction involved, the design and provisions of the purification plant (number of units, their dimensions and capacity), pumping equipment (steam-turbine-driven), delivery mains from purification plant to above cities, and the improvements to be made at these municipalities. Advantages of district procedure are also discussed.

**Recent Advances in Controlling Chloro-Tastes and Algae Development.**  
L. H. Enslow. *Journal American Water Works Association*, vol. 18, No. 5, November, 1927, pp. 621-640. (Abstract by C. R. Cox.)

This paper reviews the experiences of various plants on this continent where taste problems, due to the chlorination of water, existed. Superchlorination at one plant in Dallas, Tex., followed by subsequent chlorination of the filtered effluent, was effective in destroying tastes due to vegetable matter and algae in the raw lake water when the dose was sufficient to produce a residual of 0.3 p. p. m. or more. Experience at the Turtle Creek plant at Dallas, where iron sulphate and lime are employed to coagulate and soften the supply, indicated that the filtered water delivered to the consumer had a noticeable chlorine taste, although that in the open clear-water basin did not. It was found that these tastes were due to formation of stable hypochlorites by the reaction of chlorine and the alkaline salts in the water. This action was prevented by lowering the pH value of the filtered water prior to chlorination. The destruction of chloro-phenol tastes by the practice of superechlorination and dechlorination at Toronto, Canada, is reviewed. Importance of having sufficient reaction time between the application of the chlorine dose and the addition of the dechlorinating agent was emphasized. The prevention of formation of chloro-phenol tastes by the addition of ammonia before chlorine is then reviewed and special mention is made of satisfactory results secured at Greeneville, Tenn. where 0.25 p. p. m. ammonia were added to the raw water previous to the addition of chlorine to the water passing through the mixing basin. The cost of this treatment was about 60 cents per million gallons of water treatment. Ammonia solutions are made by the addition of 6.25 pounds of ammonia gas to 100 gallons of water, which solution was fed through an ordinary orifice box. It is significant to note that ammonia prevents the formation of chloro-phenol tastes, but does not destroy such tastes once they are formed, so that the ammonia has to be added prior to the chlorine. The suppression of algal growth in outdoor swimming pools and coagulation basins in the South by the use of chlorine is

briefly reviewed. The discussion of this paper reviewed the method of treating phenolic waste at a coke plant in Troy, N. Y., and in the destruction of chlorophenol tastes at a filtration plant in Rochester, N. Y., by the use of permanganate of potash. The doses of permanganate varied from 1.0 to 1.6 pounds per million gallons of water treated. It was also pointed out in the discussion that organic growths on sand grains can be effectively prevented by moderate doses of chlorine applied to the raw water or to the wash water. The advantages of prechlorination in the treatment of grossly polluted waters were emphasized.

**Small Iron Removal Plant for Red Bank Water Works.** Wellington Donaldson. *Engineering News-Record*, vol. 100, No. 3, January 19, 1928, pp. 112-114. (Abstract by W. M. Olson.)

This article gives the history, design considerations, and operating data concerning the new 1.5 m. g. d. plant for treating the ground water supply of Red Bank, N. J. Three photographs and an excellent cross section make clear the essential features of the plant designed to eliminate objectionable staining properties of the raw water. Raw water is pumped to a simple cascade-type aerator, flows downward through three pressure filters, and thence up to the wash-water tank, from which it spills over a weir into the distributing reservoir. Standard horizontal pressure filters were adopted in order to have the plant operate as nearly automatically as possible. Results of tests are included to show the superiority of sand to coarse contact filters.

Excessive algal growths developing in the reservoir after the installation of the new plant were combated successfully by chlorinating the effluent. The operation of the plant requires the attention of one man for less than an hour each day. The treatment works, costing \$52,881, are a good example of careful design to fit local conditions.

## DEATHS DURING WEEK ENDED MARCH 17, 1928

*Summary of information received by telegraph from industrial insurance companies for the week ended March 17, 1928, and corresponding week of 1927. (From the Weekly Health Index, March 21, 1928, issued by the Bureau of the Census, Department of Commerce)*

|  | Week ended<br>Mar. 17, 1928 | Corresponding<br>week, 1927 |
|--|-----------------------------|-----------------------------|
| Policies in force.....                                     | 70,602,861                  | 67,030,693                  |
| Number of death claims.....                                | 14,679                      | 13,711                      |
| Death claims per 1,000 policies in force, annual rate..... | 10.9                        | 10.7                        |

*Deaths from all causes in certain large cities of the United States during the week ended March 17, 1928, infant mortality, annual death rate, and comparison with corresponding week of 1927. (From the Weekly Health Index, March 21, 1928, issued by the Bureau of the Census, Department of Commerce)*

| City                      | Week ended Mar.<br>17, 1928 |                            | Annual<br>death<br>rate per<br>1,000<br>corre-<br>sponding<br>week<br>1927 | Deaths under 1<br>year            |                                    | Infant<br>mortality<br>rate,<br>week<br>ended<br>Mar. 17,<br>1928 <sup>1</sup> |
|---------------------------|-----------------------------|----------------------------|--|-----------------------------------|------------------------------------|--|
|                           | Total<br>deaths             | Death<br>rate <sup>1</sup> |  | Week<br>ended<br>Mar. 17,<br>1928 | Corre-<br>sponding<br>week<br>1927 |  |
| Total (66 cities).....    | 8,482                       | 14.9                       | 14.1   | 881                               | 935                                | 174  |
| Akron.....                | 67                          |                            |  | 13                                | 4                                  | 141  |
| Albany <sup>2</sup> ..... | 42                          | 18.2                       | 18.3   | 6                                 | 5                                  | 123  |
| Atlanta.....              | 83                          | 17.1                       | 20.9   | 7                                 | 12                                 |  |
| White.....                | 45                          |                            | 15.8   | 2                                 | 6                                  |  |
| Colored.....              | 38                          | (?)                        | 33.2   | 5                                 | 6                                  |  |

Footnotes at end of table.

*Deaths from all causes in certain large cities of the United States during the week ended March 17, 1928, infant mortality, annual death rate, and comparison with corresponding week of 1927—Continued*

| City                    | Week ended Mar. 17, 1928 |                         | Annual death rate per 1,000 corresponding week 1927 | Deaths under 1 year      |                         | Infant mortality rate, week ended Mar. 17, 1928 <sup>1</sup> |
|-------------------------|--------------------------|-------------------------|---|--------------------------|-------------------------|--|
|                         | Total deaths             | Death rate <sup>1</sup> |   | Week ended Mar. 17, 1928 | Corresponding week 1927 |  |
| Baltimore <sup>4</sup>  | 276                      | 17.4                    | 19.2  | 37                       | 31                      | 117  |
| White                   | 209                      | 16.4                    | 26  | 21                       | 104                     |  |
| Colored                 | 67                       | (*)                     | 35.5  | 11                       | 10                      | 172  |
| Birmingham              | 62                       | 14.6                    | 17.5  | 8                        | 9                       | 68   |
| White                   | 21                       | 8.2                     | 5   | 3                        | 6                       | 69   |
| Colored                 | 41                       | (*)                     | 32.0  | 3                        | 5                       | 68   |
| Boston                  | 271                      | 17.7                    | 17.2  | 29                       | 33                      | 80   |
| Bridgeport              | 46                       |                         |   | 5                        | 2                       | 92   |
| Buffalo                 | 159                      | 15.0                    | 17.9  | 24                       | 20                      | 103  |
| Cambridge               | 35                       | 14.5                    | 14.3  | 2                        | 3                       | 35   |
| Camden                  | 42                       | 16.2                    | 17.2  | 8                        | 6                       | 123  |
| Canton                  | 19                       | 8.5                     | 14.7  | 2                        | 11                      | 48   |
| Chicago <sup>4</sup>    | 880                      | 14.6                    | 12.3  | 66                       | 75                      | 57   |
| Cincinnati              | 153                      | 20.0                    | 17.0  | 13                       | 10                      | 79   |
| Cleveland               | 211                      | 10.9                    | 10.2  | 23                       | 23                      | 62   |
| Columbus                | 68                       | 12.0                    | 12.9  | 3                        | 5                       | 23   |
| Dallas                  | 56                       | 13.5                    | 9.9   | 5                        | 1                       |  |
| White                   | 42                       |                         | 8.2   | 3                        | 1                       |  |
| Colored                 | 14                       | (*)                     | 20.9  | 2                        | 0                       |  |
| Dayton                  | 34                       | 9.6                     | 13.6  | 3                        | 3                       | 50   |
| Denver                  | 83                       | 14.8                    | 15.5  | 6                        | 8                       |  |
| Des Moines              | 33                       | 11.4                    | 12.6  | 0                        | 2                       | 0  |
| Detroit                 | 355                      | 13.5                    | 13.1  | 62                       | 56                      | 96   |
| Duluth                  | 25                       | 11.2                    | 11.8  | 1                        | 3                       | 23   |
| El Paso                 | 54                       | 24.0                    | 15.2  | 11                       | 4                       |  |
| Erie                    | 31                       |                         |   | 4                        | 4                       | 82   |
| Fall River <sup>4</sup> | 20                       | 7.8                     | 15.7  | 3                        | 6                       | 51   |
| Flint                   | 28                       | 9.8                     | 12.1  | 8                        | 7                       | 102  |
| Fort Worth              | 49                       | 12.4                    | 12.7  | 2                        | 2                       |  |
| White                   | 36                       |                         | 11.9  | 1                        | 2                       |  |
| Colored                 | 4                        | (*)                     | 18.6  | 1                        | 0                       |  |
| Grand Rapids            | 33                       | 10.5                    | 6.4   | 0                        | 1                       | 0  |
| Houston                 | 63                       |                         |   | 3                        | 5                       |  |
| White                   | 49                       |                         |   | 2                        | 5                       |  |
| Colored                 | 14                       | (*)                     |   | 1                        | 0                       |  |
| Indianapolis            | 112                      | 15.3                    | 14.2  | 8                        | 7                       | 61   |
| White                   | 93                       |                         | 13.9  | 8                        | 6                       | 70   |
| Colored                 | 19                       | (*)                     | 16.3  | 9                        | 2                       | 0  |
| Jersey City             | 91                       | 14.7                    | 13.1  | 12                       | 7                       | 90   |
| Kansas City, Kans.      | 31                       | 13.7                    | 15.1  | 5                        | 5                       | 105  |
| White                   | 22                       |                         | 11.9  | 4                        | 4                       | 99   |
| Colored                 | 9                        | (*)                     | 29.5  | 1                        | 1                       | 145  |
| Knoxville               | 32                       | 15.9                    | 8.7   | 3                        | 3                       | 65   |
| White                   | 23                       |                         | 6.4   | 2                        | 3                       | 48   |
| Colored                 | 9                        | (*)                     | 25.6  | 1                        | 0                       | 213  |
| Los Angeles             | 269                      |                         |   | 21                       | 18                      | 60   |
| Lowell                  | 23                       | 10.9                    | 12.3  | 3                        | 4                       | 63   |
| Lynn                    | 20                       | 9.9                     | 13.9  | 5                        | 1                       | 126  |
| Memphis                 | 62                       | 17.0                    | 25.6  | 6                        | 6                       | 70   |
| White                   | 32                       |                         | 21.2  | 2                        | 3                       | 37   |
| Colored                 | 30                       | (*)                     | 33.7  | 4                        | 3                       | 125  |
| Milwaukee               | 121                      | 11.6                    | 12.2  | 11                       | 13                      | 49   |
| Minneapolis             | 101                      | 11.6                    | 10.4  | 5                        | 7                       | 30   |
| Nashville               | 53                       | 20.0                    | 10.6  | 9                        | 2                       | 142  |
| White                   | 37                       |                         | 7.9   | 6                        | 1                       | 123  |
| Colored                 | 16                       | (*)                     | 17.4  | 3                        | 1                       | 180  |
| New Bedford             | 30                       | 13.1                    | 12.2  | 2                        | 1                       | 43   |
| New Haven               | 61                       | 17.0                    | 10.2  | 3                        | 5                       | 42   |
| New Orleans             | 168                      | 20.5                    | 23.1  | 11                       | 16                      | 33   |
| White                   | 102                      |                         | 19.9  | 7                        | 11                      | 51   |
| Colored                 | 66                       | (*)                     | 32.1  | 4                        | 5                       | 58   |
| New York                | 1,723                    | 15.0                    | 14.2  | 206                      | 258                     | 83   |
| Bronx Borough           | 189                      | 10.4                    | 10.5  | 18                       | 23                      | 54   |
| Brooklyn Borough        | 594                      | 13.5                    | 12.3  | 78                       | 104                     | 78   |
| Manhattan Borough       | 731                      | 21.8                    | 19.7  | 92                       | 107                     | 109  |
| Queens Borough          | 150                      | 9.2                     | 10.6  | 15                       | 16                      | 60   |
| Richmond Borough        | 59                       | 20.5                    | 18.1  | 3                        | 8                       | 54   |
| Newark, N. J.           | 146                      | 16.1                    | 13.0  | 17                       | 13                      | 88   |
| Oakland                 | 60                       | 11.4                    | 10.9  | 6                        | 4                       | 65   |
| Oklahoma City           | 26                       |                         |   | 3                        | 0                       |  |

Footnotes at end of table.

*Deaths from all causes in certain large cities of the United States during the week ended March 17, 1928, infant mortality, annual death rate, and comparison with corresponding week of 1927—Continued*

| City                              | Week ended Mar. 17, 1928 |                         | Annual death rate per 1,000 corresponding week 1927 | Deaths under 1 year      |                         | Infant mortality rate, week ended Mar. 17, 1928 <sup>2</sup> |
|-----------------------------------|--------------------------|-------------------------|---|--------------------------|-------------------------|--|
|                                   | Total deaths             | Death rate <sup>1</sup> |   | Week ended Mar. 17, 1928 | Corresponding week 1927 |  |
| Omaha.....                        | 61                       | 14.3                    | 12.1  | 1                        | 4                       | 12   |
| Paterson.....                     | 45                       | 16.2                    | 15.6  | 4                        | 6                       | 69   |
| Philadelphia.....                 | 627                      | 15.9                    | 16.9  | 73                       | 58                      | 98   |
| Pittsburgh.....                   | 188                      | 14.6                    | 14.4  | 21                       | 23                      | 69   |
| Portland, Oreg.....               | 67                       |                         |   | 3                        | 2                       | 32   |
| Providence.....                   | 82                       | 15.0                    | 13.0  | 6                        | 9                       | 52   |
| Richmond.....                     | 62                       | 16.7                    | 16.6  | 7                        | 8                       | 91   |
| White.....                        | 35                       |                         | 16.1  | 4                        | 3                       | 81   |
| Colored.....                      | 27                       | (?)                     | 17.8  | 3                        | 5                       | 110  |
| Rochester.....                    | 94                       | 15.0                    | 12.9  | 5                        | 6                       | 41   |
| St. Louis.....                    | 308                      | 19.0                    | 14.4  | 20                       | 16                      | 67   |
| St. Paul.....                     | 69                       | 14.3                    | 13.8  | 2                        | 7                       | 19   |
| Salt Lake City <sup>4</sup> ..... | 32                       | 12.1                    | 16.9  | 3                        | 5                       | 49   |
| San Antonio.....                  | 107                      | 25.7                    | 13.8  | 20                       | 7                       |  |
| San Diego.....                    | 46                       | 20.1                    | 14.9  | 3                        | 2                       | 57   |
| San Francisco.....                | 137                      | 12.2                    | 12.0  | 10                       | 9                       | 63   |
| Schenectady.....                  | 18                       | 10.1                    | 13.4  | 2                        | 0                       | 63   |
| Seattle.....                      | 96                       | 13.1                    | 11.0  | 5                        | 5                       | 51   |
| Somerville.....                   | 33                       | 16.8                    | 12.8  | 5                        | 3                       | 173  |
| Spokane.....                      | 44                       | 21.1                    | 8.6   | 4                        | 3                       | 103  |
| Springfield, Mass.....            | 35                       | 12.2                    | 12.0  | 4                        | 5                       | 63   |
| Syracuse.....                     | 50                       | 13.1                    | 9.5   | 6                        | 2                       | 73   |
| Toledo.....                       | 85                       | 14.2                    | 13.0  | 9                        | 14                      | 86   |
| Trenton.....                      | 38                       | 14.3                    | 12.6  | 3                        | 4                       | 51   |
| Washington, D. C.....             | 174                      | 16.5                    | 16.1  | 13                       | 15                      | 74   |
| White.....                        | 110                      |                         | 13.4  | 4                        | 10                      | 53   |
| Colored.....                      | 64                       | (?)                     | 24.1  | 9                        | 5                       | 166  |
| Waterbury.....                    | 19                       |                         |   | 1                        | 5                       | 29   |
| Wilmington, Del.....              | 35                       | 14.2                    | 11.6  | 2                        | 8                       | 53   |
| Worcester.....                    | 57                       | 15.1                    | 14.1  | 3                        | 4                       | 36   |
| Yonkers.....                      | 27                       | 11.6                    | 12.7  | 3                        | 3                       | 68   |
| Youngstown.....                   | 31                       | 9.3                     | 11.7  | 6                        | 10                      | 80   |

<sup>1</sup> Annual rate per 1,000 population.

<sup>2</sup> Deaths under 1 year per 1,000 births. Cities left blank are not in the registration area for births.

<sup>3</sup> Data for 66 cities.

<sup>4</sup> Deaths for week ended Friday, Mar. 16, 1928.

In the cities for which deaths are shown by color, the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

# PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

## UNITED STATES

### CURRENT WEEKLY STATE REPORTS

These reports are preliminary and the figures are subject to change when later returns are received by the State health officers

#### Reports for Weeks Ended March 26, 1927, and March 24, 1928

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended March 26, 1927, and March 24, 1928

| Division and State         | Diphtheria               |                          | Influenza                |                          | Measles                  |                          | Meningoencephalitis      |                          |
|----------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|                            | Week ended Mar. 26, 1927 | Week ended Mar. 24, 1928 | Week ended Mar. 26, 1927 | Week ended Mar. 24, 1928 | Week ended Mar. 26, 1927 | Week ended Mar. 24, 1928 | Week ended Mar. 26, 1927 | Week ended Mar. 24, 1928 |
| New England States:        |                          |                          |                          |                          |                          |                          |                          |                          |
| Maine                      | 5                        | 34                       | 7                        | 131                      | 33                       | 0                        | 0                        | 0                        |
| New Hampshire              | 2                        |                          |                          |                          | 16                       |                          |                          |                          |
| Vermont                    | 1                        |                          |                          |                          | 17                       | 98                       | 0                        | 0                        |
| Massachusetts              | 89                       | 86                       | 11                       | 11                       | 261                      | 1,809                    | 2                        | 2                        |
| Rhode Island               | 11                       | 7                        |                          |                          |                          | 91                       | 0                        | 0                        |
| Connecticut                | 20                       | 23                       | 21                       | 7                        | 115                      | 301                      | 0                        | 1                        |
| Middle Atlantic States:    |                          |                          |                          |                          |                          |                          |                          |                          |
| New York                   | 387                      | 390                      | 1,64                     | 1,57                     | 767                      | 2,548                    | 7                        | 33                       |
| New Jersey                 | 100                      | 149                      | 20                       | 41                       | 68                       | 1,307                    | 1                        | 3                        |
| Pennsylvania               | 181                      | 197                      |                          |                          | 691                      | 1,345                    | 1                        | 4                        |
| East North Central States: |                          |                          |                          |                          |                          |                          |                          |                          |
| Ohio                       | 68                       |                          | 22                       |                          | 1,071                    |                          | 5                        |                          |
| Indiana                    | 25                       | 25                       | 39                       | 65                       | 282                      | 280                      | 0                        | 0                        |
| Illinois                   | 114                      | 192                      | 31                       | 251                      | 2,399                    | 232                      | 6                        | 17                       |
| Michigan                   | 114                      | 51                       |                          |                          | 305                      | 1,636                    | 0                        | 3                        |
| Wisconsin                  | 38                       | 23                       | 123                      | 78                       | 735                      | 106                      | 6                        | 6                        |
| West North Central States: |                          |                          |                          |                          |                          |                          |                          |                          |
| Minnesota                  | 25                       | 27                       | 1                        | 5                        | 285                      | 82                       | 8                        | 2                        |
| Iowa <sup>1</sup>          | 22                       | 11                       |                          |                          | 602                      | 36                       | 2                        | 2                        |
| Missouri                   | 50                       | 52                       | 21                       | 169                      | 201                      | 339                      | 2                        | 9                        |
| North Dakota               | 8                        | 3                        |                          |                          | 189                      |                          | 0                        | 3                        |
| South Dakota               | 4                        |                          | 7                        |                          | 216                      |                          | 0                        |                          |
| Nebraska                   | 4                        | 6                        | 3                        | 90                       | 323                      | 69                       | 0                        | 0                        |
| Kansas                     | 9                        | 8                        | 2                        | 50                       | 1,114                    | 87                       | 0                        | 1                        |
| South Atlantic States:     |                          |                          |                          |                          |                          |                          |                          |                          |
| Delaware                   |                          | 1                        |                          |                          | 22                       | 21                       | 1                        | 0                        |
| Maryland <sup>2</sup>      | 40                       | 22                       | 151                      | 50                       | 46                       | 1,163                    | 0                        | 0                        |
| District of Columbia       | 25                       | 21                       | 5                        | 11                       | 9                        | 182                      | 1                        | 1                        |
| Virginia                   |                          |                          |                          |                          |                          |                          |                          |                          |
| West Virginia              | 10                       | 23                       | 81                       | 50                       | 197                      | 120                      | 0                        | 2                        |
| North Carolina             | 29                       | 111                      |                          |                          | 564                      | 3,290                    | 0                        | 0                        |
| South Carolina             | 19                       | 21                       | 1,893                    | 859                      | 76                       | 950                      | 0                        | 0                        |
| Georgia                    | 21                       | 12                       | 504                      | 154                      | 86                       | 105                      | 0                        | 0                        |
| Florida                    | 41                       | 10                       | 13                       | 1                        | 157                      | 70                       | 1                        | 0                        |
| East South Central States: |                          |                          |                          |                          |                          |                          |                          |                          |
| Kentucky                   |                          |                          |                          | 16                       |                          | 240                      |                          | 0                        |
| Tennessee                  | 11                       | 3                        | 196                      | 211                      | 131                      | 281                      | 4                        | 0                        |
| Alabama                    | 25                       | 31                       | 170                      | 234                      | 238                      | 586                      | 1                        | 3                        |
| Mississippi                | 6                        | 15                       |                          |                          |                          |                          |                          | 1                        |

<sup>1</sup> New York City only.

<sup>2</sup> Week ended Friday.

**Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended March 26, 1927, and March 24, 1928—Continued**

| Division and State         | Diphtheria               |                          | Influenza                |                          | Measles                  |                          | Meningococcus meningitis |                          |
|----------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|                            | Week ended Mar. 26, 1927 | Week ended Mar. 24, 1928 | Week ended Mar. 26, 1927 | Week ended Mar. 24, 1928 | Week ended Mar. 26, 1927 | Week ended Mar. 24, 1928 | Week ended Mar. 26, 1927 | Week ended Mar. 24, 1928 |
| West South Central States: |                          |                          |                          |                          |                          |                          |                          |                          |
| Arkansas                   | 3                        | 2                        | 102                      | 377                      | 104                      | 506                      | 0                        | 0                        |
| Louisiana                  | 27                       | 11                       | 11                       | 157                      | 140                      | 374                      | 1                        | 1                        |
| Oklahoma                   | 16                       | 17                       | 134                      | 480                      | 179                      | 287                      | 2                        | 3                        |
| Texas                      | 53                       | 42                       | 25                       | 82                       | 211                      | 491                      | 0                        | 0                        |
| Mountain States:           |                          |                          |                          |                          |                          |                          |                          |                          |
| Montana                    | 2                        | 2                        | 1                        | —                        | 53                       | 1                        | 4                        | 1                        |
| Idaho                      | 3                        | —                        | —                        | —                        | 29                       | —                        | 0                        | 1                        |
| Wyoming                    | —                        | —                        | —                        | —                        | 50                       | 45                       | 0                        | 0                        |
| Colorado                   | 5                        | 26                       | 1                        | 4                        | 349                      | 25                       | 0                        | 14                       |
| New Mexico                 | 23                       | 6                        | —                        | 9                        | 76                       | 142                      | 1                        | 0                        |
| Arizona                    | 8                        | 6                        | —                        | —                        | 31                       | 27                       | 0                        | 5                        |
| Utah                       | 4                        | 4                        | 8                        | 7                        | 172                      | 11                       | 0                        | 7                        |
| Pacific States:            |                          |                          |                          |                          |                          |                          |                          |                          |
| Washington                 | 25                       | 7                        | 12                       | —                        | 392                      | 278                      | 4                        | 2                        |
| Oregon                     | 16                       | 8                        | 97                       | 49                       | 180                      | 125                      | 1                        | 2                        |
| California                 | 128                      | 102                      | 74                       | 32                       | 3,490                    | 234                      | 4                        | 4                        |
| Division and State         | Poliomyelitis            |                          | Scarlet fever            |                          | Smallpox                 |                          | Typhoid fever            |                          |
|                            | Week ended Mar. 26, 1927 | Week ended Mar. 24, 1928 | Week ended Mar. 26, 1927 | Week ended Mar. 24, 1928 | Week ended Mar. 26, 1927 | Week ended Mar. 24, 1928 | Week ended Mar. 26, 1927 | Week ended Mar. 24, 1928 |
| New England States:        |                          |                          |                          |                          |                          |                          |                          |                          |
| Maine                      | 0                        | 0                        | 53                       | 26                       | 0                        | 0                        | 2                        | 0                        |
| New Hampshire              | —                        | 0                        | —                        | 9                        | —                        | 0                        | 0                        | 0                        |
| Vermont                    | 0                        | 0                        | 8                        | 17                       | 0                        | 0                        | 0                        | 0                        |
| Massachusetts              | 0                        | 1                        | 540                      | 317                      | 0                        | 0                        | 14                       | 2                        |
| Rhode Island               | 0                        | 0                        | 20                       | 46                       | 0                        | 0                        | 0                        | 0                        |
| Connecticut                | 0                        | 0                        | 136                      | 55                       | 0                        | 0                        | 1                        | 1                        |
| Middle Atlantic States:    |                          |                          |                          |                          |                          |                          |                          |                          |
| New York                   | 0                        | 9                        | 1,215                    | 943                      | 13                       | 5                        | 22                       | 10                       |
| New Jersey                 | 0                        | 1                        | 401                      | 317                      | 0                        | 1                        | 3                        | 6                        |
| Pennsylvania               | 1                        | 3                        | 589                      | 603                      | 0                        | 0                        | 15                       | 12                       |
| East North Central States: |                          |                          |                          |                          |                          |                          |                          |                          |
| Ohio                       | 2                        | —                        | —                        | 232                      | —                        | 57                       | 4                        | 0                        |
| Indiana                    | 0                        | 0                        | 226                      | 150                      | 102                      | 238                      | 0                        | 1                        |
| Illinois                   | 2                        | 2                        | 381                      | 345                      | 51                       | 88                       | 10                       | 13                       |
| Michigan                   | 0                        | 1                        | 367                      | 277                      | 44                       | 36                       | 6                        | 4                        |
| Wisconsin                  | 1                        | 2                        | 188                      | 209                      | 7                        | 12                       | 2                        | 1                        |
| West North Central States: |                          |                          |                          |                          |                          |                          |                          |                          |
| Minnesota                  | 0                        | 0                        | 256                      | 145                      | 1                        | 0                        | 4                        | 3                        |
| Iowa                       | 0                        | 0                        | 49                       | 79                       | 30                       | 33                       | 20                       | 0                        |
| Missouri                   | 0                        | 2                        | 148                      | 105                      | 247                      | 71                       | 1                        | 1                        |
| North Dakota               | 1                        | 0                        | 44                       | 79                       | 1                        | 0                        | 0                        | 2                        |
| South Dakota               | 0                        | —                        | 73                       | —                        | 21                       | —                        | 0                        | 0                        |
| Nebraska                   | 0                        | 0                        | 72                       | 100                      | 32                       | 53                       | 0                        | 0                        |
| Kansas                     | 1                        | 1                        | 149                      | 196                      | 32                       | 84                       | 1                        | 0                        |
| South Atlantic States:     |                          |                          |                          |                          |                          |                          |                          |                          |
| Delaware                   | 0                        | 0                        | 31                       | 3                        | 0                        | 0                        | 0                        | 0                        |
| Maryland                   | 0                        | 0                        | 66                       | 72                       | 0                        | 0                        | 7                        | 5                        |
| District of Columbia       | 0                        | 1                        | 26                       | 44                       | 0                        | 2                        | 1                        | 1                        |
| Virginia                   | —                        | —                        | —                        | —                        | 1                        | —                        | —                        | —                        |
| West Virginia              | 0                        | 1                        | —                        | 54                       | 25                       | 67                       | 10                       | 3                        |
| North Carolina             | 0                        | 0                        | 27                       | 23                       | 88                       | 121                      | 4                        | 3                        |
| South Carolina             | 0                        | 0                        | 2                        | 4                        | 16                       | 7                        | 7                        | 2                        |
| Georgia                    | 0                        | 0                        | 13                       | 27                       | 111                      | 0                        | 8                        | 3                        |
| Florida                    | 0                        | 0                        | 8                        | 6                        | 53                       | 2                        | 10                       | 7                        |
| East South Central States: |                          |                          |                          |                          |                          |                          |                          |                          |
| Kentucky                   | —                        | 3                        | —                        | 34                       | —                        | 19                       | —                        | 3                        |
| Tennessee                  | 1                        | 0                        | 21                       | 17                       | 16                       | 20                       | 15                       | 5                        |
| Alabama                    | 1                        | 1                        | 13                       | 19                       | 51                       | 10                       | 23                       | 13                       |
| Mississippi                | 0                        | 0                        | 7                        | 16                       | 5                        | 3                        | 5                        | 3                        |

Exclusive of Tulsa

<sup>2</sup> Week ended Friday.

*Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended March 26, 1927, and March 24, 1928—Continued*

| Division and State                | Poliomyelitis            |                          | Scarlet fever            |                          | Smallpox                 |                          | Typhoid fever            |                          |
|-----------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|                                   | Week ended Mar. 26, 1927 | Week ended Mar. 24, 1928 | Week ended Mar. 26, 1927 | Week ended Mar. 24, 1928 | Week ended Mar. 26, 1927 | Week ended Mar. 24, 1928 | Week ended Mar. 26, 1927 | Week ended Mar. 24, 1928 |
| <b>West South Central States:</b> |                          |                          |                          |                          |                          |                          |                          |                          |
| Arkansas                          | 0                        | 0                        | 22                       | 26                       | 9                        | 11                       | 5                        | 4                        |
| Louisiana                         | 0                        | 0                        | 5                        | 15                       | 5                        | 34                       | 11                       | 4                        |
| Oklahoma                          | 0                        | 1                        | 62                       | 68                       | 38                       | 245                      | 14                       | 3                        |
| Texas                             | 0                        | 0                        | 26                       | 144                      | 29                       | 48                       | 22                       | 4                        |
| <b>Mountain States:</b>           |                          |                          |                          |                          |                          |                          |                          |                          |
| Montana                           | 0                        | 0                        | 54                       | 6                        | 7                        | 16                       | 0                        | 0                        |
| Idaho                             | 0                        | 0                        | 14                       | 10                       | 8                        | 1                        | 0                        | 0                        |
| Wyoming                           | 0                        | 0                        | 19                       | 14                       | 3                        | 3                        | 0                        | 0                        |
| Colorado                          | 0                        | 0                        | 193                      | 61                       | 8                        | 2                        | 0                        | 0                        |
| New Mexico                        | 0                        | 0                        | 14                       | 31                       | 1                        | 1                        | 0                        | 1                        |
| Arizona                           | 0                        | 0                        | 9                        | 5                        | 0                        | 20                       | 1                        | 0                        |
| Utah                              | 0                        | 0                        | 26                       | 6                        | 3                        | 14                       | 0                        | 0                        |
| <b>Pacific States:</b>            |                          |                          |                          |                          |                          |                          |                          |                          |
| Washington                        | 0                        | 0                        | 92                       | 37                       | 64                       | 49                       | 2                        | 2                        |
| Oregon                            | 0                        | 1                        | 43                       | 17                       | 0                        | 77                       | 1                        | 1                        |
| California                        | 2                        | 2                        | 231                      | 153                      | 15                       | 29                       | 8                        | 5                        |

\* Week ended Friday.

\* Exclusive of Tulsa.

**Report for Week Ended March 17, 1928**

|               | DISTRICT OF COLUMBIA | Cases |
|---------------|----------------------|-------|
| Diphtheria    |                      | 25    |
| Measles       |                      | 198   |
| Scarlet fever |                      | 45    |
| Smallpox      |                      | 9     |

**Report for Week Ended March 10, 1928**

|                     | MONTANA | Cases |
|---------------------|---------|-------|
| Diphtheria          |         | 14    |
| Measles             |         | 2     |
| Meningoencephalitis |         | 5     |
| Scarlet fever       |         | 40    |
| Smallpox            |         | 23    |

**SUMMARY OF MONTHLY REPORTS FROM STATES**

† The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week:

| State                 | Menin-<br>goec-<br>cuss<br>menin-<br>gitis | Diph-<br>theria | Influ-<br>enza | Malaria | Meas-<br>sles | Pel-<br>lagra | Poli-<br>omyelitis | Scarlet<br>fever | Small-<br>pox | Ty-<br>phoid<br>fever |
|-----------------------|--|-----------------|----------------|---------|---------------|---------------|--------------------|------------------|---------------|-----------------------|
| <i>January, 1928</i>  |  |                 |                |         |               |               |                    |                  |               |                       |
| Hawaii Territory      | 6  | 63              | 15             |         | 7             |               | 0                  | 2                | 0             | 4                     |
| <i>February, 1928</i> |  |                 |                |         |               |               |                    |                  |               |                       |
| Indiana               | 2  | 141             | 143            |         | 533           |               | 0                  | 577              | 471           | 11                    |
| Iowa                  | 10   | 66              | 16             |         | 193           |               | 0                  | 416              | 235           | 9                     |
| Louisiana             | 1  | 86              | 345            | 100     | 874           | 10            | 3                  | 44               | 99            | 43                    |
| Maryland              | 2  | 164             | 202            |         | 2,921         | 1             | 1                  | 293              | 1             | 15                    |
| Minnesota             | 13   | 123             | 10             |         | 42            |               | 1                  | 268              | 12            | 9                     |
| New Jersey            | 7  | 595             | 90             |         | 2,415         |               | 1                  | 1,197            | 1             | 13                    |
| Ohio                  | 16   | 587             | 119            |         | 3,715         |               | 10                 | 1,512            | 122           | 30                    |
| Wyoming               | 9  | 7               |                |         | 173           |               |                    | 100              | 16            | 1                     |

March 30, 1928

| January, 1928           |       | Cases | Mumps:                 | Cases |
|-------------------------|-------|-------|------------------------|-------|
| Hawaii Territory:       |       |       | Indiana                | 215   |
| Chicken pox             | 29    |       | Iowa                   | 218   |
| Conjunctivitis          | 252   |       | Louisiana              | 19    |
| Hookworm disease        | 1     |       | Maryland               | 133   |
| Leprosy                 | 4     |       | Ohio                   | 1,843 |
| Mumps                   | 48    |       | Wyoming                | 17    |
| Tetanus                 | 3     |       | Ophthalmia neonatorum: |       |
| Trachoma                | 47    |       | New Jersey             | 6     |
| Whooping cough          | 34    |       | Ohio                   | 102   |
| February, 1928          |       |       | Puerperal fever:       |       |
| Actinomycosis:          |       |       | Ohio                   | 1     |
| Minnesota               | 1     |       | Rabies in animals:     |       |
| Anthrax:                |       |       | Maryland               | 3     |
| New Jersey              | 3     |       | Scabies:               |       |
| Chicken pox:            |       |       | Iowa                   | 23    |
| Indiana                 | 273   |       | Maryland               | 2     |
| Iowa                    | 310   |       | Septic sore throat:    |       |
| Louisiana               | 38    |       | Indiana                | 2     |
| Maryland                | 565   |       | Iowa                   | 1     |
| Minnesota               | 416   |       | Louisiana              | 3     |
| New Jersey              | 896   |       | Maryland               | 12    |
| Ohio                    | 1,500 |       | Ohio                   | 82    |
| Wyoming                 | 26    |       | Tetanus:               |       |
| Dysentery:              |       |       | Louisiana              | 2     |
| Minnesota               | 4     |       | Maryland               | 4     |
| German measles:         |       |       | Trachoma:              |       |
| Iowa                    | 8     |       | Louisiana              | 1     |
| Maryland                | 15    |       | Maryland               | 1     |
| New Jersey              | 173   |       | Minnesota              | 1     |
| Ohio                    | 50    |       | New Jersey             | 2     |
| Wyoming                 | 3     |       | Ohio                   | 4     |
| Hookworm disease:       |       |       | Trench mouth:          |       |
| Louisiana               | 20    |       | Maryland               | 1     |
| Impetigo contagiosa:    |       |       | Trichinosis:           |       |
| Iowa                    | 6     |       | New Jersey             | 14    |
| Maryland                | 5     |       | Tularemia:             |       |
| Lead poisoning:         |       |       | Louisiana              | 1     |
| New Jersey              | 2     |       | Maryland               | 3     |
| Ohio                    | 19    |       | Vincent's angina:      |       |
| Leprosy:                |       |       | Maryland               | 13    |
| Louisiana               | 4     |       | Whooping cough:        |       |
| Lethargic encephalitis: |       |       | Indiana                | 82    |
| Louisiana               | 2     |       | Iowa                   | 40    |
| Maryland                | 6     |       | Louisiana              | 30    |
| Minnesota               | 1     |       | Maryland               | 192   |
| Ohio                    | 4     |       | Minnesota              | 101   |
| Malta fever:            |       |       | New Jersey             | 631   |
| Minnesota               | 1     |       | Ohio                   | 726   |
|                         |       |       | Wyoming                | 37    |

## RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of February, 1928, by departments of health of certain States to other State health departments

| Referred by— | Actino-<br>myco-<br>sis | Chick-<br>en pox | Diph-<br>theria | Amoebic<br>dysen-<br>tery | Malta<br>fever | Scarlet<br>fever | Small-<br>pox | Tuber-<br>culosis | Ty-<br>phoid<br>fever | Whoop-<br>ing<br>cough |
|--------------|-------------------------|------------------|-----------------|---------------------------|----------------|------------------|---------------|-------------------|-----------------------|------------------------|
| California   |                         |                  |                 |                           | 1              |                  |               | 2                 | 1                     |                        |
| Connecticut  |                         |                  | 1               |                           |                | 1                |               |                   |                       |                        |
| Illinois     |                         |                  |                 |                           |                |                  | 1             |                   | 2                     |                        |
| Minnesota    | 1                       | 1                |                 | 3                         |                |                  |               | 61                | 1                     |                        |
| New York     |                         |                  |                 |                           |                | 2                |               |                   |                       | 2                      |

## GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 97 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of nearly 31,196,000. The estimated population of the 92 cities reporting deaths is more than 30,580,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

*Weeks ended March 10, 1928, and March 12, 1927*

|                          |  | 1928   | 1927   | Estimated expectancy |
|--------------------------|--|--------|--------|----------------------|
| <i>Cases reported</i>    |  |        |        |                      |
| Diphtheria:              |  |        |        |                      |
| 42 States                |  | 1,707  | 1,719  |                      |
| 97 cities                |  | 1,034  | 1,083  | 923                  |
| Measles:                 |  |        |        |                      |
| 41 States                |  | 17,401 | 15,788 |                      |
| 97 cities                |  | 6,754  | 5,540  |                      |
| Poliomyelitis:           |  |        |        |                      |
| 42 States                |  | 31     | 12     |                      |
| Scarlet fever:           |  |        |        |                      |
| 42 States                |  | 5,102  | 6,277  |                      |
| 97 cities                |  | 1,800  | 2,644  | 1,158                |
| Smallpox:                |  |        |        |                      |
| 42 States                |  | 1,241  | 945    |                      |
| 97 cities                |  | 135    | 174    | 134                  |
| Typhoid fever:           |  |        |        |                      |
| 42 States                |  | 122    | 227    |                      |
| 97 cities                |  | 22     | 45     | 39                   |
| <i>Deaths reported</i>   |  |        |        |                      |
| Influenza and pneumonia: |  |        |        |                      |
| 92 cities                |  | 1,240  | 1,252  |                      |
| Smallpox:                |  |        |        |                      |
| 92 cities                |  | 0      | 0      |                      |

*City reports for week ended March 10, 1928*

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding week of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded and the estimated expectancy is the mean number of cases reported for the week during non-epidemic years.

If reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1919 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviations from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

| Division, State, and city | Population July 1, 1926, estimated | Chick-en pox, cases reported | Diphtheria                  |                | Influenza      |                 | Measles, cases reported | Mumps, cases reported | Pneumonia, deaths reported |
|---------------------------|------------------------------------|------------------------------|-----------------------------|----------------|----------------|-----------------|-------------------------|-----------------------|----------------------------|
|                           |                                    |                              | Cases, estimated expectancy | Cases reported | Cases reported | Deaths reported |                         |                       |                            |
| <b>NEW ENGLAND</b>        |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Maine:                    |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Portland                  | 76,400                             | 13                           | 2                           | 1              | 1              | 0               | 0                       | 12                    | 2                          |
| New Hampshire:            |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Concord                   | 1 22,546                           | 0                            | 0                           | 0              | 0              | 0               | 0                       | 0                     | 0                          |
| Manchester                | 84,000                             | 0                            | 2                           | 0              | 0              | 1               | 9                       | 0                     | 4                          |

<sup>1</sup> Estimated July 1, 1925.

## City reports for week ended March 10, 1928—Continued

| Division, State, and city    | Population July 1, 1926, estimated | Chick-en pox, cases reported | Diphtheria                  |                | Influenza      |                 | Measles, cases reported | Mumps, cases reported | Pneumonia, deaths reported |
|------------------------------|------------------------------------|------------------------------|-----------------------------|----------------|----------------|-----------------|-------------------------|-----------------------|----------------------------|
|                              |                                    |                              | Cases, estimated expectancy | Cases reported | Cases reported | Deaths reported |                         |                       |                            |
| <b>NEW ENGLAND—continued</b> |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Vermont:                     |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Barre                        | 10,008                             | 0                            | 0                           | 0              | 0              | 0               | 0                       | 0                     | 0                          |
| Burlington                   | 24,089                             | 0                            | 0                           | 0              | 0              | 0               | 0                       | 0                     | 1                          |
| Massachusetts:               |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Boston                       | 757,000                            | 55                           | 47                          | 31             | 1              | 3               | 455                     | 11                    | 38                         |
| Fall River                   | 131,000                            | 4                            | 4                           | 4              | 0              | 2               | 2                       | 0                     | 3                          |
| Springfield                  | 145,000                            | 9                            | 3                           | 3              | 0              | 0               | 2                       | 48                    | 1                          |
| Worcester                    | 193,000                            | 28                           | 4                           | 1              | 0              | 0               | 14                      | 116                   | 3                          |
| Rhode Island:                |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Pawtucket                    | 71,000                             | 5                            | 1                           | 0              | 0              | 0               | 6                       | 20                    | 1                          |
| Providence                   | 275,000                            | 3                            | 8                           | 9              | 0              | 2               | 49                      | 6                     | 9                          |
| Connecticut:                 |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Bridgeport                   | (7)                                | 5                            | 7                           | 11             | 1              | 1               | 0                       | 0                     | 10                         |
| Hartford                     | 164,000                            | 10                           | 8                           | 3              | 2              | 1               | 5                       | 7                     | 10                         |
| New Haven                    | 132,000                            | 6                            | 2                           | 0              | 0              | 0               | 188                     | 128                   | 12                         |
| <b>MIDDLE ATLANTIC</b>       |                                    |                              |                             |                |                |                 |                         |                       |                            |
| New York:                    |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Buffalo                      | 544,000                            | 10                           | 11                          | 16             | 1              | 1               | 388                     | 30                    | 19                         |
| New York                     | 5,924,000                          | 212                          | 215                         | 277            | 49             | 29              | 741                     | 43                    | 260                        |
| Rochester                    | 321,000                            | 11                           | 10                          | 8              | 1              | 1               | 12                      | 21                    | 6                          |
| Syracuse                     | 185,000                            | 41                           | 4                           | 3              | 0              | 0               | 80                      | 10                    | 9                          |
| New Jersey:                  |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Camden                       | 131,000                            | 3                            | 6                           | 4              | 1              | 1               | 8                       | 6                     | 4                          |
| Newark                       | 459,000                            | 36                           | 13                          | 20             | 10             | 0               | 321                     | 20                    | 24                         |
| Trenton                      | 134,000                            | 1                            | 3                           | 4              | 0              | 0               | 3                       | 1                     | 4                          |
| Pennsylvania:                |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Philadelphia                 | 2,008,000                          | 0                            | 74                          | 70             | 13             | 13              | 225                     | 0                     | 89                         |
| Pittsburgh                   | 637,000                            | 21                           | 20                          | 33             | 3              | 3               | 212                     | 131                   | 36                         |
| Reading                      | 114,000                            | 7                            | 3                           | 4              | 1              | 1               | 2                       | 2                     | 2                          |
| <b>EAST NORTH CENTRAL</b>    |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Ohio:                        |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Cincinnati                   | 411,000                            | 18                           | 8                           | 22             | 0              | 0               | 262                     | 2                     | 14                         |
| Cleveland                    | 960,000                            | 60                           | 27                          | 65             | 26             | 6               | 34                      | 247                   | 32                         |
| Columbus                     | 285,000                            | 8                            | 4                           | 1              | 0              | 0               | 13                      | 7                     | 1                          |
| Toledo                       | 295,000                            | 53                           | 6                           | 6              | 0              | 0               | 368                     | 22                    | 4                          |
| Indiana:                     |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Fort Wayne                   | 99,900                             | 1                            | 2                           | 1              | 0              | 0               | 0                       | 0                     | 1                          |
| Indianapolis                 | 367,000                            | 30                           | 8                           | 4              | 0              | 2               | 53                      | 132                   | 9                          |
| South Bend                   | 81,700                             | 1                            | 1                           | 0              | 0              | 0               | 0                       | 0                     | 1                          |
| Terre Haute                  | 71,900                             | 1                            | 1                           | 0              | 0              | 1               | 0                       | 0                     | 2                          |
| Illinois:                    |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Chicago                      | 3,048,000                          | 122                          | 79                          | 103            | 20             | 8               | 36                      | 60                    | 110                        |
| Springfield                  | 64,700                             | 11                           | 0                           | 0              | 2              | 2               | 0                       | 11                    | 1                          |
| Michigan:                    |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Detroit                      | 1,290,000                          | 65                           | 59                          | 45             | 7              | 3               | 880                     | 76                    | 46                         |
| Flint                        | 136,000                            | 17                           | 4                           | 2              | 0              | 0               | 23                      | 244                   | 8                          |
| Grand Rapids                 | 186,000                            | 4                            | 2                           | 0              | 0              | 2               | 14                      | 17                    | 5                          |
| Wisconsin:                   |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Kenosha                      | 52,700                             | 21                           | 2                           | 0              | 0              | 0               | 2                       | 1                     | 0                          |
| Milwaukee                    | 517,000                            | 63                           | 17                          | 18             | 1              | 1               | 4                       | 51                    | 6                          |
| Racine                       | 69,400                             | 5                            | 2                           | 0              | 0              | 0               | 1                       | 2                     | 1                          |
| Superior                     | 139,671                            | 1                            | 0                           | 1              | 0              | 0               | 0                       | 6                     | 1                          |
| <b>WEST NORTH CENTRAL</b>    |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Minnesota:                   |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Duluth                       | 113,000                            | 4                            | 1                           | 0              | 0              | 0               | 1                       | 5                     | 1                          |
| Minneapolis                  | 434,000                            | 107                          | 15                          | 7              | 2              | 2               | 37                      | 175                   | 11                         |
| St. Paul                     | 248,000                            | 19                           | 13                          | 3              | 0              | 0               | 0                       | 67                    | 7                          |
| Iowa:                        |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Davenport                    | 132,469                            | 4                            | 1                           | 0              | 0              | 0               | 0                       | 0                     | —                          |
| Des Moines                   | 146,000                            | 0                            | 2                           | 0              | 0              | 0               | 0                       | 0                     | —                          |
| Sioux City                   | 78,000                             | —                            | 2                           | —              | —              | —               | —                       | —                     | —                          |
| Waterloo                     | 36,900                             | 4                            | 0                           | 0              | 0              | 0               | 2                       | 0                     | —                          |
| Missouri:                    |                                    |                              |                             |                |                |                 |                         |                       |                            |
| Kansas City                  | 375,000                            | 36                           | 7                           | 3              | 0              | 3               | 46                      | 200                   | 13                         |
| St. Joseph                   | 78,400                             | 2                            | 1                           | 0              | 1              | 0               | 0                       | 12                    | 3                          |
| St. Louis                    | 830,000                            | 19                           | 42                          | 45             | 2              | 0               | 158                     | 15                    | —                          |

<sup>1</sup> Estimated, July 1, 1925.<sup>2</sup> No estimate made.

## City reports for week ended March 10, 1928—Continued

| Division, State, and city           | Population July 1, 1926, estimated | Chick-en pox, cases re-por-<br>ted | Diphtheria                          |                     | Influenza           |                      | Meas-<br>sles,<br>cases re-<br>ported | Mumps,<br>cases re-<br>ported | Pneu-<br>monia,<br>deaths re-<br>ported |
|-------------------------------------|------------------------------------|------------------------------------|-------------------------------------|---------------------|---------------------|----------------------|---------------------------------------|-------------------------------|---|
|                                     |                                    |                                    | Cases, esti-<br>mated<br>expectancy | Cases re-<br>ported | Cases re-<br>ported | Deaths re-<br>ported |                                       |                               |   |
|                                     |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| <b>WEST NORTH CENTRAL—continued</b> |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| North Dakota:                       |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Fargo                               | 1 26,403                           |                                    | 1                                   | 0                   | 0                   | 0                    |                                       | 1                             | 0                                       |
| Grand Forks                         | 1 14,811                           | 0                                  | 0                                   | 0                   | 0                   | 0                    |                                       | 2                             | 0                                       |
| South Dakota:                       |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Aberdeen                            | 1 15,036                           | 6                                  | 0                                   | 0                   | 0                   | 0                    |                                       | 0                             | 0                                       |
| Sioux Falls                         | 1 30,127                           | 0                                  | 1                                   | 0                   | 0                   | 0                    |                                       | 1                             | 0                                       |
| Nebraska:                           |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Lincoln                             | 62,000                             | 23                                 | 1                                   | 1                   | 0                   | 0                    | 1                                     | 36                            | 0                                       |
| Omaha                               | 216,000                            | 20                                 | 3                                   | 6                   | 0                   | 0                    | 0                                     | 2                             | 7                                       |
| Kansas:                             |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Topeka                              | 56,500                             | 32                                 | 1                                   | 1                   | 2                   | 1                    | 0                                     | 8                             | 2                                       |
| Wichita                             | 92,500                             | 13                                 | 2                                   | 2                   | 0                   | 0                    | 1                                     | 2                             | 3                                       |
| <b>SOUTH ATLANTIC</b>               |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Delaware:                           |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Wilmington                          | 124,000                            | 1                                  | 2                                   | 2                   | 0                   | 0                    | 2                                     | 11                            | 5                                       |
| Maryland:                           |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Baltimore                           | 808,000                            | 105                                | 29                                  | 27                  | 31                  | 2                    | 791                                   | 20                            | 43                                      |
| Cumberland                          | 1 33,741                           | 1                                  | 1                                   | 0                   | 0                   | 0                    | 0                                     | 0                             | 1                                       |
| Frederick                           | 1 12,035                           | 0                                  | 0                                   | 0                   | 0                   | 0                    | 1                                     | 0                             | 0                                       |
| District of Columbia:               |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Washington                          | 528,000                            | 23                                 | 13                                  | 15                  | 4                   | 3                    | 102                                   | 0                             | 19                                      |
| Virginia:                           |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Lynchburg                           | 30,500                             | 1                                  | 1                                   | 6                   | 0                   | 1                    | 26                                    | 1                             | 2                                       |
| Norfolk                             | 174,000                            | 35                                 | 1                                   | 2                   | 0                   | 0                    | 96                                    | 0                             | 8                                       |
| Richmond                            | 189,000                            | 3                                  | 2                                   | 3                   | 0                   | 0                    | 139                                   | 2                             | 9                                       |
| Roanoke                             | 61,900                             | 7                                  | 0                                   | 3                   | 0                   | 0                    | 19                                    | 0                             | 2                                       |
| West Virginia:                      |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Charleston                          | 50,700                             | 0                                  | 0                                   | 0                   | 0                   | 0                    | 0                                     | 0                             | 1                                       |
| Wheeling                            | 1 56,208                           | 3                                  | 1                                   | 1                   | 0                   | 0                    | 8                                     | 0                             | 2                                       |
| North Carolina:                     |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Raleigh                             | 1 30,371                           | 8                                  | 0                                   | 3                   | 0                   | 0                    | 87                                    | 0                             | 2                                       |
| Wilmington                          | 37,700                             | 6                                  | 0                                   | 0                   | 0                   | 0                    | 11                                    | 0                             | 3                                       |
| Winston-Salem                       | 71,800                             | 5                                  | 1                                   | 0                   | 0                   | 0                    | 190                                   | 17                            | 3                                       |
| South Carolina:                     |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Charleston                          | 74,100                             | 2                                  | 0                                   | 0                   | 17                  | 0                    | 5                                     | 1                             | 4                                       |
| Columbia                            | 41,800                             | 15                                 | 1                                   | 0                   | 0                   | 0                    | 48                                    | 33                            | 3                                       |
| Greenville                          | 1 27,311                           | 1                                  | 0                                   | 0                   | 0                   | 0                    | 13                                    | 3                             | 3                                       |
| Georgia:                            |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Atlanta                             | (?)                                | 9                                  | 3                                   | 9                   | 25                  | 4                    | 5                                     | 12                            | 9                                       |
| Brunswick                           | 1 16,809                           | 0                                  | 0                                   | 0                   | 0                   | 0                    | 15                                    | 0                             | 0                                       |
| Savannah                            | 94,900                             | 1                                  | 0                                   | 0                   | 9                   | 3                    | 10                                    | 2                             | 2                                       |
| Florida:                            |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Miami                               | 1 69,754                           | 2                                  | 6                                   | 2                   | 0                   | 0                    | 0                                     | 1                             | 3                                       |
| St. Petersburg                      | 1 26,847                           | 0                                  | 0                                   | 0                   | 0                   | 0                    | 0                                     | 2                             | 2                                       |
| Tampa                               | 102,000                            | 5                                  | 2                                   | 0                   | 0                   | 1                    | 0                                     | 2                             | 0                                       |
| <b>EAST SOUTH CENTRAL</b>           |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Kentucky:                           |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Covington                           | 58,500                             | 1                                  | 1                                   | 0                   | 0                   | 0                    | 23                                    | 0                             | 3                                       |
| Louisville                          | 311,000                            | 4                                  | 4                                   | 4                   | 0                   | 0                    | 60                                    | 21                            | 11                                      |
| Tennessee:                          |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Memphis                             | 177,000                            | 12                                 | 4                                   | 3                   | 0                   | 0                    | 60                                    | 21                            | 11                                      |
| Nashville                           | 137,000                            | 7                                  | 1                                   | 5                   | 0                   | 0                    | 23                                    | 1                             | 8                                       |
| Alabama:                            |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Birmingham                          | 211,000                            | 14                                 | 2                                   | 2                   | 15                  | 6                    | 50                                    | 10                            | 15                                      |
| Mobile                              | 66,800                             | 0                                  | 0                                   | 1                   | 5                   | 1                    | 0                                     | 0                             | 3                                       |
| Montgomery                          | 47,000                             | 15                                 | 1                                   | 1                   | 0                   | 0                    | 19                                    | 0                             | —                                       |
| <b>WEST SOUTH CENTRAL</b>           |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Arkansas:                           |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Fort Smith                          | 1 31,643                           | 1                                  | 1                                   | 0                   | 0                   | 0                    | 0                                     | 2                             | —                                       |
| Little Rock                         | 75,900                             | 1                                  | 0                                   | 0                   | 3                   | 0                    | 81                                    | 6                             | 6                                       |
| Louisiana:                          |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| New Orleans                         | 419,000                            | 3                                  | 10                                  | 24                  | 22                  | 9                    | 1                                     | 0                             | 23                                      |
| Shreveport                          | 55,500                             | 10                                 | 0                                   | 0                   | 0                   | 3                    | 156                                   | 1                             | 3                                       |
| Oklahoma:                           |                                    |                                    |                                     |                     |                     |                      |                                       |                               |   |
| Oklahoma City                       | (?)                                | 4                                  | 1                                   | 2                   | 12                  | 3                    | 15                                    | 14                            | 7                                       |
| Tulsa                               | 133,000                            | 37                                 | 1                                   | 0                   | 0                   | 2                    | 39                                    | 39                            | —                                       |

<sup>1</sup> Estimated, July 1, 1925.<sup>2</sup> No estimate made.

## City reports for week ended March 10, 1928—Continued

| Division, State, and city           | Population, July 1, 1926, estimated | Chick-en pox, cases reported | Diphtheria                  |                | Influenza      |                 | Measles, cases reported | Mumps, cases reported | Pneumonia, deaths reported |
|-------------------------------------|-------------------------------------|------------------------------|-----------------------------|----------------|----------------|-----------------|-------------------------|-----------------------|----------------------------|
|                                     |                                     |                              | Cases, estimated expectancy | Cases reported | Cases reported | Deaths reported |                         |                       |                            |
| <b>WEST SOUTH CENTRAL—continued</b> |                                     |                              |                             |                |                |                 |                         |                       |                            |
| Texas:                              |                                     |                              |                             |                |                |                 |                         |                       |                            |
| Dallas                              | 203,000                             | 31                           | 5                           | 3              | 0              | 0               | 1                       | 1                     | 2                          |
| Galveston                           | 49,100                              | 0                            | 1                           | 1              | 0              | 0               | 0                       | 0                     | 2                          |
| Houston                             | 1 164,954                           | 6                            | 3                           | 12             | 0              | 1               | 39                      | 0                     | 7                          |
| San Antonio                         | 205,000                             | 3                            | 2                           | 2              | 0              | 5               | 45                      | 0                     | 19                         |
| <b>MOUNTAIN</b>                     |                                     |                              |                             |                |                |                 |                         |                       |                            |
| Montana:                            |                                     |                              |                             |                |                |                 |                         |                       |                            |
| Billings                            | 1 17,971                            | 0                            | 1                           | 0              | 0              | 0               | 0                       | 1                     | 2                          |
| Great Falls                         | 1 29,883                            | 6                            | 0                           | 0              | 0              | 0               | 1                       | 0                     | 0                          |
| Helena                              | 1 12,037                            | 0                            | 0                           | 0              | 0              | 0               | 0                       | 0                     | 2                          |
| Missoula                            | 1 12,668                            | 0                            | 0                           | 0              | 0              | 0               | 0                       | 0                     | 0                          |
| Idaho:                              |                                     |                              |                             |                |                |                 |                         |                       |                            |
| Bolse                               | 1 23,042                            |                              | 0                           |                |                |                 |                         |                       |                            |
| Colorado:                           |                                     |                              |                             |                |                |                 |                         |                       |                            |
| Denver                              | 285,000                             | 40                           | 10                          | 8              | 0              | 5               | 27                      | 105                   | 17                         |
| Pueblo                              | 43,900                              | 3                            | 1                           | 0              | 0              | 0               | 1                       | 0                     | 1                          |
| New Mexico:                         |                                     |                              |                             |                |                |                 |                         |                       |                            |
| Albuquerque                         | 1 21,000                            | 6                            | 1                           | 1              | 0              | 0               | 39                      | 0                     | 0                          |
| Utah:                               |                                     |                              |                             |                |                |                 |                         |                       |                            |
| Salt Lake City                      | 133,000                             | 13                           | 3                           | 3              | 0              | 2               | 3                       | 6                     | 8                          |
| Nevada:                             |                                     |                              |                             |                |                |                 |                         |                       |                            |
| Reno                                | 1 12,665                            | 0                            | 1                           | 0              | 0              | 0               | 0                       | 0                     | 0                          |
| <b>PACIFIC</b>                      |                                     |                              |                             |                |                |                 |                         |                       |                            |
| Washington:                         |                                     |                              |                             |                |                |                 |                         |                       |                            |
| Seattle                             | (?)                                 | 24                           | 6                           | 13             | 0              | 217             | 12                      | —                     | —                          |
| Spokane                             | 100,000                             | 14                           | 3                           | 1              | 0              | 0               | 0                       | 0                     | —                          |
| Tacoma                              | 100,000                             | 9                            | 2                           | 0              | 0              | 7               | 27                      | 1                     | —                          |
| Oregon:                             |                                     |                              |                             |                |                |                 |                         |                       |                            |
| Portland                            | 1 282,383                           | 31                           | 7                           | 2              | 2              | 0               | 14                      | 4                     | 3                          |
| California:                         |                                     |                              |                             |                |                |                 |                         |                       |                            |
| Los Angeles                         | (?)                                 | 115                          | 39                          | 42             | 27             | 4               | 76                      | 48                    | 24                         |
| Sacramento                          | 73,400                              | 5                            | 1                           | 0              | 1              | 1               | 14                      | 0                     | 4                          |
| San Francisco                       | 567,000                             | 121                          | 21                          | 11             | 1              | 1               | 40                      | 53                    | 7                          |

| Division, State, and city | Scarlet fever               |                | Smallpox                    |                | Tuber-cu-losis, deaths reported | Typhoid fever   |                             | Whoop-ing cough, cases reported | Deaths, all causes |
|---------------------------|-----------------------------|----------------|-----------------------------|----------------|---------------------------------|-----------------|-----------------------------|---------------------------------|--------------------|
|                           | Cases, estimated expectancy | Cases reported | Cases, estimated expectancy | Cases reported |                                 | Deaths reported | Cases, estimated expectancy | Cases reported                  |                    |
| <b>NEW ENGLAND</b>        |                             |                |                             |                |                                 |                 |                             |                                 |                    |
| Maine:                    |                             |                |                             |                |                                 |                 |                             |                                 |                    |
| Portland                  | 4                           | 10             | 0                           | 0              | 0                               | 0               | 0                           | 0                               | 8                  |
| New Hampshire:            |                             |                |                             |                |                                 |                 |                             |                                 |                    |
| Concord                   | 0                           | 0              | 0                           | 0              | 0                               | 2               | 0                           | 0                               | 0                  |
| Manchester                | 2                           | 3              | 0                           | 0              | 0                               | 1               | 0                           | 0                               | 23                 |
| Vermont:                  |                             |                |                             |                |                                 |                 |                             |                                 |                    |
| Barre                     | 0                           | 0              | 0                           | 0              | 0                               | 1               | 0                           | 0                               | 4                  |
| Burlington                | 1                           | 0              | 1                           | 0              | 0                               | 0               | 0                           | 0                               | 11                 |
| Massachusetts:            |                             |                |                             |                |                                 |                 |                             |                                 |                    |
| Boston                    | 77                          | 73             | 0                           | 0              | 0                               | 13              | 2                           | 0                               | 57                 |
| Fall River                | 4                           | 10             | 0                           | 0              | 0                               | 4               | 1                           | 0                               | 32                 |
| Springfield               | 7                           | 23             | 0                           | 0              | 0                               | 1               | 0                           | 0                               | 2                  |
| Worcester                 | 10                          | 4              | 0                           | 0              | 0                               | 3               | 0                           | 0                               | 24                 |
| Rhode Island:             |                             |                |                             |                |                                 |                 |                             |                                 |                    |
| Pawtucket                 | 1                           | 0              | 0                           | 0              | 0                               | 1               | 0                           | 0                               | 23                 |
| Providence                | 9                           | 32             | 0                           | 0              | 0                               | 6               | 0                           | 0                               | 72                 |
| Connecticut:              |                             |                |                             |                |                                 |                 |                             |                                 |                    |
| Bridgeport                | 12                          | 5              | 0                           | 0              | 0                               | 3               | 0                           | 0                               | 1                  |
| Hartford                  | 7                           | 7              | 0                           | 0              | 0                               | 3               | 0                           | 0                               | 49                 |
| New Haven                 | 11                          | 2              | 0                           | 0              | 0                               | 1               | 0                           | 0                               | 27                 |

<sup>1</sup> Estimated, July 1, 1925.<sup>2</sup> No estimate made.

## City reports for week ended March 10, 1928—Continued

| Division, State, and city | Scarlet fever                               |                        | Smallpox                                    |                        |                         | Tuber-<br>culosis,<br>deaths<br>re-<br>ported | Typhoid fever                               |                        |                         | Whoop-<br>ing<br>cough,<br>cases<br>re-<br>ported | Deaths,<br>all<br>causes |
|---------------------------|---|------------------------|---|------------------------|-------------------------|---|---|------------------------|-------------------------|---|--------------------------|
|                           | Cases,<br>esti-<br>mated<br>expect-<br>ancy | Cases<br>re-<br>ported | Cases,<br>esti-<br>mated<br>expect-<br>ancy | Cases<br>re-<br>ported | Deaths<br>re-<br>ported |   | Cases,<br>esti-<br>mated<br>expect-<br>ancy | Cases<br>re-<br>ported | Deaths<br>re-<br>ported |   |                          |
| <b>MIDDLE ATLANTIC</b>    |   |                        |   |                        |                         |   |   |                        |                         |   |                          |
| New York:                 |   |                        |   |                        |                         |   |   |                        |                         |   |                          |
| Buffalo.....              | 23  | 35                     | 0   | 0                      | 0                       | 13  | 0   | 0                      | 0                       | 50  | 177                      |
| New York.....             | 30  | 466                    | 0   | 0                      | 0                       | 94  | 7   | 3                      | 1                       | 145   | 1,622                    |
| Rochester.....            | 15  | 4                      | 0   | 0                      | 0                       | 3   | 0   | 0                      | 0                       | 3   | 76                       |
| Syracuse.....             | 13  | 19                     | 0   | 0                      | 0                       | 5   | 1   | 0                      | 0                       | 50  | 70                       |
| New Jersey:               |   |                        |   |                        |                         |   |   |                        |                         |   |                          |
| Camden.....               | 6   | 0                      | 0   | 0                      | 0                       | 3   | 0   | 0                      | 0                       | 0   | 35                       |
| Newark.....               | 34  | 53                     | 0   | 0                      | 0                       | 9   | 0   | 0                      | 0                       | 30  | 146                      |
| Trenton.....              | 5   | 4                      | 0   | 0                      | 0                       | 0   | 1   | 0                      | 0                       | 2   | 49                       |
| Pennsylvania:             |   |                        |   |                        |                         |   |   |                        |                         |   |                          |
| Philadelphia.....         | 87  | 94                     | 1   | 0                      | 0                       | 32  | 2   | 1                      | 0                       | 99  | 592                      |
| Pittsburgh.....           | 31  | 27                     | 0   | 0                      | 0                       | 12  | 0   | 2                      | 0                       | 14  | 227                      |
| Reading.....              | 4   | 32                     | 0   | 0                      | 0                       | 0   | 0   | 0                      | 0                       | 1   | 30                       |
| <b>EAST NORTH CENTRAL</b> |   |                        |   |                        |                         |   |   |                        |                         |   |                          |
| Ohio:                     |   |                        |   |                        |                         |   |   |                        |                         |   |                          |
| Cincinnati.....           | 19  | 30                     | 1   | 0                      | 0                       | 11  | 0   | 0                      | 0                       | 12  | 161                      |
| Cleveland.....            | 52  | 34                     | 1   | 0                      | 0                       | 18  | 1   | 1                      | 0                       | 78  | 193                      |
| Columbus.....             | 11  | 12                     | 1   | 0                      | 0                       | 2   | 0   | 1                      | 0                       | 4   | 68                       |
| Toledo.....               | 14  | 6                      | 2   | 0                      | 0                       | 8   | 1   | 0                      | 1                       | 11  | 74                       |
| Indiana:                  |   |                        |   |                        |                         |   |   |                        |                         |   |                          |
| Fort Wayne.....           | 5   | 4                      | 1   | 0                      | 0                       | 3   | 0   | 0                      | 0                       | 1   | 32                       |
| Indianapolis.....         | 11  | 14                     | 12  | 6                      | 0                       | 7   | 0   | 4                      | 0                       | 11  | 100                      |
| South Bend.....           | 4   | 1                      | 1   | 0                      | 0                       | 0   | 0   | 0                      | 0                       | 2   | 20                       |
| Terre Haute.....          | 3   | 0                      | 0   | 5                      | 0                       | 1   | 0   | 0                      | 0                       | 0   | 16                       |
| Illinois:                 |   |                        |   |                        |                         |   |   |                        |                         |   |                          |
| Chicago.....              | 133   | 137                    | 2   | 7                      | 0                       | 55  | 2   | 0                      | 0                       | 132   | 830                      |
| Springfield.....          | 2   | 18                     | 0   | 2                      | 0                       | 4   | 0   | 0                      | 0                       | 2   | 22                       |
| Michigan:                 |   |                        |   |                        |                         |   |   |                        |                         |   |                          |
| Detroit.....              | 97  | 117                    | 2   | 0                      | 0                       | 29  | 1   | 0                      | 0                       | 96  | 324                      |
| Flint.....                | 8   | 16                     | 1   | 2                      | 0                       | 1   | 0   | 0                      | 0                       | 12  | 36                       |
| Grand Rapids.....         | 11  | 5                      | 1   | 0                      | 0                       | 0   | 0   | 0                      | 0                       | 3   | 27                       |
| Wisconsin:                |   |                        |   |                        |                         |   |   |                        |                         |   |                          |
| Kenosha.....              | 3   | 2                      | 1   | 0                      | 0                       | 0   | 0   | 0                      | 0                       | 4   | 6                        |
| Milwaukee.....            | 28  | 49                     | 2   | 0                      | 0                       | 9   | 0   | 0                      | 0                       | 19  | 118                      |
| Racine.....               | 5   | 8                      | 1   | 0                      | 0                       | 2   | 0   | 0                      | 0                       | 4   | 15                       |
| Superior.....             | 3   | 0                      | 1   | 0                      | 0                       | 0   | 1   | 0                      | 0                       | 0   | 10                       |
| <b>WEST NORTH CENTRAL</b> |   |                        |   |                        |                         |   |   |                        |                         |   |                          |
| Minnesota:                |   |                        |   |                        |                         |   |   |                        |                         |   |                          |
| Duluth.....               | 9   | 10                     | 1   | 0                      | 0                       | 1   | 0   | 0                      | 0                       | 0   | 20                       |
| Minneapolis.....          | 60  | 29                     | 5   | 0                      | 0                       | 3   | 1   | 0                      | 0                       | 14  | 94                       |
| St. Paul.....             | 34  | 13                     | 6   | 0                      | 0                       | 8   | 1   | 0                      | 0                       | 13  | 77                       |
| Iowa:                     |   |                        |   |                        |                         |   |   |                        |                         |   |                          |
| Davenport.....            | 2   | 3                      | 3   | 0                      | 0                       | 0   | 0   | 0                      | 0                       | 0   | —                        |
| Des Moines.....           | 6   | 17                     | 1   | 14                     | 0                       | 0   | 0   | 0                      | 0                       | 0   | 30                       |
| Sioux City.....           | 2   | —                      | 1   | —                      | —                       | 0   | —   | —                      | —                       | —   | —                        |
| Waterloo.....             | 2   | 3                      | 1   | 1                      | 0                       | 0   | 0   | 0                      | 2                       | —   | —                        |
| Missouri:                 |   |                        |   |                        |                         |   |   |                        |                         |   |                          |
| Kansas City.....          | 12  | 32                     | 4   | 2                      | 0                       | 7   | 0   | 0                      | 0                       | 17  | 115                      |
| St. Joseph.....           | 3   | 5                      | 0   | 11                     | 0                       | 0   | 1   | 0                      | 0                       | 0   | 32                       |
| St. Louis.....            | 35  | 42                     | 5   | 2                      | 0                       | 14  | 1   | 1                      | 0                       | 26  | 285                      |
| North Dakota:             |   |                        |   |                        |                         |   |   |                        |                         |   |                          |
| Fargo.....                | 3   | —                      | 0   | —                      | —                       | 0   | —   | —                      | —                       | 0   | —                        |
| Grand Forks.....          | 0   | 3                      | 0   | 0                      | —                       | 0   | 0   | —                      | —                       | 0   | —                        |
| South Dakota:             |   |                        |   |                        |                         |   |   |                        |                         |   |                          |
| Aberdeen.....             | 4   | 0                      | 0   | 0                      | —                       | 0   | 0   | —                      | —                       | 4   | —                        |
| Sioux Falls.....          | 3   | 0                      | 0   | 0                      | —                       | 0   | 0   | —                      | —                       | 0   | 8                        |
| Nebraska:                 |   |                        |   |                        |                         |   |   |                        |                         |   |                          |
| Lincoln.....              | 2   | 3                      | 0   | 4                      | 0                       | 0   | 0   | 0                      | 0                       | 6   | 6                        |
| Omaha.....                | 3   | 7                      | 10  | 7                      | 0                       | 2   | 0   | 0                      | 0                       | 0   | 57                       |
| Kansas:                   |   |                        |   |                        |                         |   |   |                        |                         |   |                          |
| Topeka.....               | 3   | 3                      | 1   | 5                      | 0                       | 1   | 0   | 0                      | 0                       | 2   | 23                       |
| Wichita.....              | 3   | 4                      | 1   | 19                     | 0                       | 1   | 0   | 0                      | 0                       | 1   | 30                       |

**City reports for week ended March 10, 1928—Continued**

## City reports for the week ended March 10, 1928—Continued

| Division, State, and city | Scarlet fever                  |                 | Smallpox                       |                 |                  | Tuber-cu-losis, deaths re-ported | Typhoid fever                  |                 |                  | Whoop-ing cough, cases re-ported | Deaths all causes |
|---------------------------|--------------------------------|-----------------|--------------------------------|-----------------|------------------|----------------------------------|--------------------------------|-----------------|------------------|----------------------------------|-------------------|
|                           | Cases, es-ti-mated ex-pectancy | Cases re-ported | Cases, es-ti-mated ex-pectancy | Cases re-ported | Deaths re-ported |                                  | Cases, es-ti-mated ex-pectancy | Cases re-ported | Deaths re-ported |                                  |                   |
| <b>MOUNTAIN—CON.</b>      |                                |                 |                                |                 |                  |                                  |                                |                 |                  |                                  |                   |
| Idaho:                    |                                |                 |                                |                 |                  |                                  |                                |                 |                  |                                  |                   |
| Boise                     | 0                              |                 | 1                              |                 |                  |                                  | 0                              |                 |                  |                                  |                   |
| Colorado:                 |                                |                 |                                |                 |                  |                                  |                                |                 |                  |                                  |                   |
| Denver                    | 15                             | 12              | 2                              | 0               | 0                | 11                               | 1                              | 0               | 0                | 9                                | 100               |
| Pueblo                    | 3                              | 2               | 0                              | 0               | 0                | 0                                | 1                              | 0               | 0                | 6                                | 9                 |
| New Mexico:               |                                |                 |                                |                 |                  |                                  |                                |                 |                  |                                  |                   |
| Albuquerque               | 2                              | 2               | 0                              | 0               | 0                | 5                                | 0                              | 0               | 0                | 0                                | 12                |
| Utah:                     |                                |                 |                                |                 |                  |                                  |                                |                 |                  |                                  |                   |
| Salt Lake City            | 3                              | 5               | 1                              | 8               | 0                | 0                                | 0                              | 0               | 0                | 14                               | 31                |
| Nevada:                   |                                |                 |                                |                 |                  |                                  |                                |                 |                  |                                  |                   |
| Reno                      | 0                              | 0               | 0                              | 0               | 0                | 0                                | 0                              | 0               | 0                | 0                                | 4                 |
| <b>PACIFIC</b>            |                                |                 |                                |                 |                  |                                  |                                |                 |                  |                                  |                   |
| Washington:               |                                |                 |                                |                 |                  |                                  |                                |                 |                  |                                  |                   |
| Seattle                   | 11                             | 1               | 5                              | 1               |                  |                                  | 1                              | 0               |                  | 6                                |                   |
| Spokane                   | 6                              | 7               | 6                              | 25              |                  |                                  | 0                              | 0               |                  | 0                                |                   |
| Tacoma                    | 3                              | 4               | 4                              | 0               | 0                | 1                                | 1                              | 1               | 0                | 7                                | 21                |
| Oregon:                   |                                |                 |                                |                 |                  |                                  |                                |                 |                  |                                  |                   |
| Portland                  | 6                              | 7               | 10                             | 44              | 0                | 3                                | 1                              | 1               | 0                | 0                                | 69                |
| California:               |                                |                 |                                |                 |                  |                                  |                                |                 |                  |                                  |                   |
| Los Angeles               | 31                             | 20              | 7                              | 0               | 0                | 29                               | 2                              | 0               | 0                | 10                               | 293               |
| Sacramento                | 2                              | 5               | 1                              | 0               | 0                | 1                                | 0                              | 0               | 0                | 0                                | 24                |
| San Francisco             | 16                             | 38              | 5                              | 0               | 0                | 17                               | 1                              | 0               | 0                | 13                               | 176               |

| Division, State, and city | Cerebrospinal meningitis |        | Lethargic encephalitis |        | Pellagra |        | Poliomyelitis (infan-tile paralysis) |       |        |
|---------------------------|--------------------------|--------|------------------------|--------|----------|--------|--------------------------------------|-------|--------|
|                           | Cases                    | Deaths | Cases                  | Deaths | Cases    | Deaths | Cases, es-ti-mated ex-pectancy       | Cases | Deaths |
| <b>NEW ENGLAND</b>        |                          |        |                        |        |          |        |                                      |       |        |
| Massachusetts:            |                          |        |                        |        |          |        |                                      |       |        |
| Boston                    | 1                        | 0      | 0                      | 0      | 1        | 0      | 0                                    | 1     | 0      |
| Worcester                 | 1                        | 0      | 0                      | 0      | 0        | 0      | 0                                    | 0     | 0      |
| <b>MIDDLE ATLANTIC</b>    |                          |        |                        |        |          |        |                                      |       |        |
| New York:                 |                          |        |                        |        |          |        |                                      |       |        |
| Buffalo                   | 1                        | 1      | 0                      | 0      | 0        | 0      | 0                                    | 0     | 0      |
| New York                  | 17                       | 6      | 3                      | 2      | 0        | 0      | 1                                    | 0     | 0      |
| New Jersey:               |                          |        |                        |        |          |        |                                      |       |        |
| Newark                    | 0                        | 0      | 1                      | 0      | 0        | 0      | 0                                    | 0     | 0      |
| Pennsylvania:             |                          |        |                        |        |          |        |                                      |       |        |
| Philadelphia              | 2                        | 3      | 0                      | 0      | 0        | 0      | 0                                    | 0     | 0      |
| Pittsburgh                | 3                        | 2      | 0                      | 0      | 0        | 0      | 0                                    | 0     | 0      |
| <b>EAST NORTH CENTRAL</b> |                          |        |                        |        |          |        |                                      |       |        |
| Ohio:                     |                          |        |                        |        |          |        |                                      |       |        |
| Cincinnati                | 0                        | 1      | 0                      | 1      | 0        | 1      | 0                                    | 0     | 0      |
| Cleveland                 | 2                        | 0      | 0                      | 0      | 0        | 0      | 0                                    | 0     | 0      |
| Columbus                  | 0                        | 0      | 0                      | 0      | 0        | 0      | 0                                    | 1     | 1      |
| Toledo                    | 0                        | 1      | 0                      | 0      | 0        | 0      | 0                                    | 0     | 0      |
| Indiana:                  |                          |        |                        |        |          |        |                                      |       |        |
| Indianapolis              | 1                        | 4      | 0                      | 0      | 0        | 0      | 0                                    | 0     | 0      |
| Illinois:                 |                          |        |                        |        |          |        |                                      |       |        |
| Chicago                   | 9                        | 7      | 1                      | 0      | 0        | 0      | 1                                    | 1     | 1      |
| Michigan:                 |                          |        |                        |        |          |        |                                      |       |        |
| Detroit                   | 1                        | 0      | 1                      | 0      | 0        | 0      | 1                                    | 0     | 0      |
| Wisconsin:                |                          |        |                        |        |          |        |                                      |       |        |
| Milwaukee                 | 3                        | 2      | 0                      | 0      | 0        | 0      | 0                                    | 0     | 0      |

## City reports for the week ended March 10, 1928—Continued

| Division<br>State, and city | Cerebrospinal<br>meningitis |        | Lethargic<br>encephalitis |        | Pellagra |        | Poliomyelitis (infan-<br>tile paralysis) |       |        |
|-----------------------------|-----------------------------|--------|---------------------------|--------|----------|--------|--|-------|--------|
|                             | Cases                       | Deaths | Cases                     | Deaths | Cases    | Deaths | Cases, est-<br>imated expect-<br>ancy    | Cases | Deaths |
| <b>WEST NORTH CENTRAL</b>   |                             |        |                           |        |          |        |  |       |        |
| Minnesota:                  |                             |        |                           |        |          |        |  |       |        |
| Duluth.....                 | 0                           | 0      | 0                         | 1      | 0        | 0      | 0  | 0     | 0      |
| Minneapolis.....            | 0                           | 0      | 1                         | 1      | 0        | 0      | 0  | 0     | 0      |
| Missouri:                   |                             |        |                           |        |          |        |  |       |        |
| Kansas City.....            | 0                           | 1      | 0                         | 0      | 0        | 0      | 0  | 1     | 0      |
| St. Louis.....              | 4                           | 1      | 0                         | 0      | 0        | 0      | 1  | 1     | 0      |
| <b>SOUTH ATLANTIC</b>       |                             |        |                           |        |          |        |  |       |        |
| Virginia:                   |                             |        |                           |        |          |        |  |       |        |
| Norfolk.....                | 1                           | 0      | 0                         | 0      | 0        | 0      | 0  | 0     | 0      |
| Roanoke.....                | 0                           | 0      | 0                         | 0      | 0        | 1      | 0  | 0     | 0      |
| North Carolina:             |                             |        |                           |        |          |        |  |       |        |
| Raleigh.....                | 0                           | 0      | 0                         | 0      | 0        | 0      | 0  | 0     | 1      |
| Wilmington.....             | 0                           | 1      | 0                         | 0      | 0        | 0      | 0  | 0     | 0      |
| South Carolina:             |                             |        |                           |        |          |        |  |       |        |
| Columbia.....               | 0                           | 0      | 0                         | 0      | 0        | 2      | 0  | 0     | 0      |
| Georgia:                    |                             |        |                           |        |          |        |  |       |        |
| Atlanta.....                | 0                           | 0      | 0                         | 0      | 1        | 2      | 0  | 0     | 0      |
| Savannah.....               | 0                           | 0      | 0                         | 0      | 1        | 0      | 0  | 0     | 0      |
| <b>EAST SOUTH CENTRAL</b>   |                             |        |                           |        |          |        |  |       |        |
| Alabama:                    |                             |        |                           |        |          |        |  |       |        |
| Birmingham.....             | 0                           | 0      | 0                         | 0      | 2        | 0      | 0  | 0     | 0      |
| <b>WEST SOUTH CENTRAL</b>   |                             |        |                           |        |          |        |  |       |        |
| Louisiana:                  |                             |        |                           |        |          |        |  |       |        |
| New Orleans.....            | 1                           | 1      | 0                         | 0      | 2        | 1      | 0  | 0     | 0      |
| Oklahoma:                   |                             |        |                           |        |          |        |  |       |        |
| Tulsa.....                  | 1                           | 0      | 0                         | 0      | 0        | 0      | 0  | 0     | 0      |
| Texas:                      |                             |        |                           |        |          |        |  |       |        |
| Houston.....                | 1                           | 1      | 0                         | 0      | 0        | 0      | 0  | 0     | 0      |
| <b>MOUNTAIN</b>             |                             |        |                           |        |          |        |  |       |        |
| Colorado:                   |                             |        |                           |        |          |        |  |       |        |
| Denver.....                 | 6                           | 2      | 0                         | 0      | 0        | 0      | 0  | 0     | 0      |
| Pueblo.....                 | 0                           | 1      | 0                         | 0      | 0        | 0      | 0  | 0     | 0      |
| New Mexico:                 |                             |        |                           |        |          |        |  |       |        |
| Albuquerque.....            | 1                           | 1      | 0                         | 0      | 0        | 0      | 0  | 0     | 0      |
| Utah:                       |                             |        |                           |        |          |        |  |       |        |
| Salt Lake City.....         | 1                           | 0      | 0                         | 0      | 0        | 0      | 0  | 0     | 0      |
| Nevada:                     |                             |        |                           |        |          |        |  |       |        |
| Reno.....                   | 1                           | 0      | 0                         | 0      | 0        | 0      | 0  | 0     | 0      |
| <b>PACIFIC</b>              |                             |        |                           |        |          |        |  |       |        |
| Washington:                 |                             |        |                           |        |          |        |  |       |        |
| Spokane.....                | 3                           | 0      | 0                         | 0      | 0        | 0      | 0  | 0     | 0      |
| Oregon:                     |                             |        |                           |        |          |        |  |       |        |
| Portland.....               | 1                           | 0      | 0                         | 0      | 0        | 0      | 0  | 1     | 0      |
| California:                 |                             |        |                           |        |          |        |  |       |        |
| Los Angeles.....            | 1                           | 0      | 0                         | 0      | 0        | 0      | 1  | 2     | 0      |
| Sacramento.....             | 0                           | 0      | 0                         | 0      | 0        | 0      | 0  | 1     | 0      |
| San Francisco.....          | 3                           | 1      | 0                         | 0      | 0        | 0      | 0  | 0     | 0      |

The following table gives the rates per 100,000 population for 101 cities for the five-week period ended March 10, 1928, compared with those for a like period ended March 12, 1927. The population figures used in computing the rates are approximate estimates as of July 1, 1927 and 1928, respectively, authoritative figures for many of the cities not being available. The 101 cities reporting cases had estimated aggregate populations of approximately 31,050,000 in 1927

and 31,657,000 in 1928. The 95 cities reporting deaths had nearly 30,370,000 estimated population in 1927 and nearly 30,961,000 in 1928. The number of cities included in each group and the estimated aggregate populations are shown in a separate table below:

*Summary of weekly reports from cities, February 5 to March 10, 1928—Annual rates per 100,000 population compared with rates for the corresponding period of 1927*<sup>1</sup>

DIPHTHERIA CASE RATES

|                    | Week ended—         |                     |                     |                     |                     |                     |                    |                    |                     |                     |
|--------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|--------------------|--------------------|---------------------|---------------------|
|                    | Feb.<br>12,<br>1927 | Feb.<br>11,<br>1928 | Feb.<br>19,<br>1927 | Feb.<br>18,<br>1928 | Feb.<br>26,<br>1927 | Feb.<br>25,<br>1928 | Mar.<br>5,<br>1927 | Mar.<br>3,<br>1928 | Mar.<br>12,<br>1927 | Mar.<br>10,<br>1928 |
|                    | 101 cities          | 177                 | 167                 | 203                 | 175                 | 179                 | 174                | 182                | <sup>2</sup> 173    | 183                 |
| New England        | 174                 | 136                 | 133                 | 172                 | 149                 | 138                 | 163                | 140                | 128                 | 145                 |
| Middle Atlantic    | 188                 | 230                 | 277                 | 234                 | 199                 | 224                 | 223                | 233                | 230                 | 214                 |
| East North Central | 179                 | 175                 | 168                 | 169                 | 188                 | 169                 | 176                | 164                | 165                 | 171                 |
| West North Central | 154                 | 99                  | 164                 | 125                 | 109                 | 125                 | 115                | 113                | 133                 | <sup>4</sup> 136    |
| South Atlantic     | 222                 | 112                 | 191                 | 149                 | 191                 | 156                 | 195                | 130                | 155                 | 124                 |
| East South Central | 61                  | 55                  | 86                  | 55                  | 117                 | 35                  | 81                 | 112                | 112                 | <sup>5</sup> 87     |
| West South Central | 149                 | 128                 | 170                 | 124                 | 194                 | 188                 | 149                | 92                 | 190                 | 168                 |
| Mountain           | 152                 | 44                  | 161                 | 186                 | 72                  | 71                  | 233                | 186                | 197                 | <sup>6</sup> 101    |
| Pacific            | 167                 | 133                 | 188                 | 82                  | 151                 | 161                 | 133                | 141                | 198                 | 171                 |

MEASLES CASE RATES

| 101 cities         | 652   | 791   | 810   | 892   | 862    | 998   | 880   | <sup>2</sup> 1,123 | 952   | <sup>3</sup> 1,132 |
|--------------------|-------|-------|-------|-------|--------|-------|-------|--------------------|-------|--------------------|
| New England        | 339   | 1,614 | 181   | 1,657 | 228    | 1,908 | 172   | 1,979              | 198   | 1,657              |
| Middle Atlantic    | 45    | 647   | 68    | 700   | 74     | 877   | 67    | 1,000              | 80    | 970                |
| East North Central | 786   | 440   | 1,009 | 531   | 1,015  | 565   | 1,173 | 761                | 1,169 | 865                |
| West North Central | 683   | 216   | 564   | 240   | 960    | 255   | 952   | 341                | 1,241 | <sup>4</sup> 498   |
| South Atlantic     | 359   | 1,959 | 792   | 2,246 | 651    | 2,406 | 794   | 2,576              | 783   | 2,784              |
| East South Central | 451   | 1,132 | 467   | 1,347 | 461    | 1,202 | 538   | <sup>2</sup> 1,000 | 314   | <sup>5</sup> 1,272 |
| West South Central | 451   | 1,304 | 562   | 1,890 | 591    | 1,959 | 720   | 1,695              | 1,187 | 1,300              |
| Mountain           | 7,845 | 186   | 9,665 | 97    | 10,624 | 168   | 8,132 | 142                | 9,091 | <sup>6</sup> 295   |
| Pacific            | 2,220 | 718   | 2,774 | 692   | 2,965  | 749   | 3,030 | 892                | 3,252 | 904                |

SCARLET FEVER CASE RATES

| 101 cities         | 300   | 300 | 438   | 291 | 424   | 295 | 418   | <sup>2</sup> 293 | 446   | <sup>3</sup> 303 |
|--------------------|-------|-----|-------|-----|-------|-----|-------|------------------|-------|------------------|
| New England        | 537   | 432 | 470   | 441 | 542   | 414 | 423   | 347              | 591   | 377              |
| Middle Atlantic    | 423   | 333 | 581   | 330 | 531   | 335 | 532   | 345              | 583   | 358              |
| East North Central | 325   | 310 | 322   | 280 | 366   | 285 | 309   | 309              | 309   | 292              |
| West North Central | 499   | 290 | 540   | 265 | 445   | 275 | 443   | 261              | 471   | <sup>4</sup> 301 |
| South Atlantic     | 258   | 231 | 249   | 228 | 218   | 282 | 180   | 254              | 193   | 268              |
| East South Central | 223   | 135 | 243   | 190 | 183   | 185 | 218   | <sup>2</sup> 116 | 279   | <sup>5</sup> 182 |
| West South Central | 74    | 100 | 66    | 116 | 116   | 120 | 66    | 96               | 120   | 128              |
| Mountain           | 1,246 | 540 | 1,246 | 345 | 1,192 | 206 | 1,076 | 257              | 1,112 | <sup>6</sup> 203 |
| Pacific            | 389   | 192 | 340   | 230 | 313   | 233 | 329   | 194              | 285   | 192              |

SMALLPOX CASE RATES

| 101 cities         | 26 | 21  | 33  | 20  | 25  | 24  | 21  | <sup>2</sup> 17 | 30 | <sup>3</sup> 23  |
|--------------------|----|-----|-----|-----|-----|-----|-----|-----------------|----|------------------|
| New England        | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0               | 0  | 0                |
| Middle Atlantic    | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0               | 0  | 0                |
| East North Central | 15 | 14  | 28  | 12  | 15  | 13  | 21  | 18              | 34 | 14               |
| West North Central | 71 | 100 | 81  | 101 | 63  | 92  | 53  | 62              | 53 | <sup>4</sup> 95  |
| South Atlantic     | 63 | 21  | 60  | 26  | 45  | 26  | 52  | 10              | 54 | 25               |
| East South Central | 81 | 15  | 132 | 25  | 71  | 40  | 122 | <sup>2</sup> 0  | 81 | <sup>5</sup> 22  |
| West South Central | 66 | 16  | 62  | 20  | 50  | 8   | 50  | 20              | 70 | 36               |
| Mountain           | 18 | 44  | 27  | 108 | 0   | 62  | 0   | 53              | 0  | <sup>6</sup> 120 |
| Pacific            | 76 | 69  | 94  | 18  | 104 | 125 | 13  | 49              | 94 | 69               |

<sup>1</sup> The figures given in this table are rates per 100,000 population annual basis and not the number of cases reported. Populations used are estimated as of July 1, 1927 and 1928, respectively.

<sup>2</sup> Louisville, Ky., not included.

<sup>3</sup> Sioux City, Iowa; Fargo, N. Dak.; Louisville, Ky.; and Boise, Idaho, not included.

<sup>4</sup> Sioux City, Iowa, and Fargo, N. Dak., not included.

<sup>5</sup> Boise, Idaho, not included.

Summary of weekly reports from cities, February 5 to March 10, 1928—Annual rates per 100,000 population compared with rates for the corresponding period of 1927—Continued.

## TYPHOID FEVER CASE RATES

|                         | Week ended—         |                     |                     |                     |                     |                     |                    |                    |                     |                     |
|-------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|--------------------|--------------------|---------------------|---------------------|
|                         | Feb.<br>12,<br>1927 | Feb.<br>11,<br>1928 | Feb.<br>19,<br>1927 | Feb.<br>18,<br>1928 | Feb.<br>26,<br>1927 | Feb.<br>25,<br>1928 | Mar.<br>5,<br>1927 | Mar.<br>3,<br>1928 | Mar.<br>12,<br>1927 | Mar.<br>10,<br>1928 |
| 101 cities.....         | 7                   | 7                   | 9                   | 5                   | 8                   | 5                   | 9                  | 10                 | 8                   | 4                   |
| New England.....        | 5                   | 9                   | 2                   | 5                   | 9                   | 7                   | 2                  | 0                  | 12                  | 2                   |
| Middle Atlantic.....    | 5                   | 6                   | 10                  | 3                   | 1                   | 5                   | 5                  | 8                  | 8                   | 3                   |
| East North Central..... | 3                   | 6                   | 4                   | 3                   | 6                   | 1                   | 6                  | 7                  | 1                   | 4                   |
| West North Central..... | 6                   | 6                   | 10                  | 4                   | 8                   | 4                   | 10                 | 6                  | 4                   | 4                   |
| South Atlantic.....     | 18                  | 9                   | 23                  | 7                   | 29                  | 9                   | 23                 | 12                 | 11                  | 9                   |
| East South Central..... | 10                  | 5                   | 30                  | 15                  | 25                  | 20                  | 41                 | 73                 | 30                  | 7                   |
| West South Central..... | 12                  | 40                  | 8                   | 12                  | 4                   | 16                  | 8                  | 32                 | 17                  | 4                   |
| Mountain.....           | 0                   | 0                   | 0                   | 0                   | 18                  | 0                   | 9                  | 9                  | 0                   | 0                   |
| Pacific.....            | 18                  | 0                   | 3                   | 8                   | 8                   | 5                   | 8                  | 8                  | 10                  | 3                   |

## INFLUENZA DEATH RATES

|                         |    |    |    |    |    |    |    |     |    |    |
|-------------------------|----|----|----|----|----|----|----|-----|----|----|
| 95 cities.....          | 24 | 17 | 23 | 22 | 22 | 21 | 25 | 24  | 27 | 23 |
| New England.....        | 2  | 7  | 9  | 11 | 12 | 7  | 9  | 7   | 12 | 21 |
| Middle Atlantic.....    | 28 | 15 | 25 | 18 | 22 | 24 | 24 | 16  | 25 | 19 |
| East North Central..... | 22 | 10 | 19 | 12 | 17 | 14 | 23 | 17  | 16 | 16 |
| West North Central..... | 14 | 4  | 23 | 6  | 10 | 2  | 17 | 10  | 14 | 12 |
| South Atlantic.....     | 23 | 30 | 31 | 35 | 41 | 28 | 47 | 32  | 70 | 25 |
| East South Central..... | 37 | 42 | 43 | 37 | 43 | 31 | 21 | 125 | 80 | 55 |
| West South Central..... | 38 | 57 | 38 | 90 | 25 | 74 | 38 | 103 | 47 | 74 |
| Mountain.....           | 72 | 53 | 27 | 71 | 54 | 35 | 54 | 88  | 54 | 64 |
| Pacific.....            | 21 | 20 | 17 | 27 | 17 | 20 | 17 | 24  | 7  | 20 |

## PNEUMONIA DEATH RATES

|                         |     |     |     |     |     |     |     |     |     |     |
|-------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 95 cities.....          | 147 | 168 | 146 | 174 | 163 | 161 | 171 | 188 | 188 | 191 |
| New England.....        | 165 | 149 | 102 | 170 | 184 | 147 | 202 | 193 | 188 | 205 |
| Middle Atlantic.....    | 173 | 200 | 148 | 195 | 176 | 155 | 193 | 217 | 222 | 221 |
| East North Central..... | 128 | 114 | 121 | 137 | 145 | 156 | 132 | 148 | 157 | 156 |
| West North Central..... | 95  | 106 | 91  | 94  | 91  | 71  | 104 | 106 | 81  | 97  |
| South Atlantic.....     | 168 | 224 | 234 | 216 | 233 | 228 | 229 | 217 | 272 | 214 |
| East South Central..... | 117 | 235 | 175 | 204 | 122 | 220 | 271 | 249 | 196 | 312 |
| West South Central..... | 144 | 201 | 204 | 279 | 161 | 271 | 183 | 263 | 161 | 254 |
| Mountain.....           | 143 | 150 | 188 | 168 | 134 | 248 | 126 | 265 | 170 | 276 |
| Pacific.....            | 114 | 182 | 176 | 172 | 131 | 115 | 121 | 155 | 148 | 122 |

<sup>2</sup> Louisville, Ky., not included.

<sup>3</sup> Sioux City, Iowa; Fargo, N. Dak.; Louisville, Ky.; and Boise, Idaho, not included.

<sup>4</sup> Sioux City, Iowa, and Fargo, N. Dak., not included.

<sup>5</sup> Boise, Idaho, not included.

<sup>6</sup> Fargo, N. Dak., Louisville, Ky., and Boise, Idaho, not included.

<sup>7</sup> Fargo, N. Dak., not included.

Number of cities included in summary of weekly reports, and aggregate population of cities in each group, approximated as of July 1, 1927 and 1928, respectively

| Group of cities         | Number of cities reporting cases | Number of cities reporting deaths | Aggregate population of cities reporting cases |            | Aggregate population of cities reporting deaths |            |
|-------------------------|----------------------------------|-----------------------------------|--|------------|---|------------|
|                         |                                  |                                   | 1927   | 1928       | 1927  | 1928       |
| Total.....              | 101                              | 95                                | 31,050,300                                     | 31,657,000 | 30,360,500                                      | 30,960,700 |
| New England.....        | 12                               | 12                                | 2,242,700                                      | 2,274,400  | 2,242,700                                       | 2,274,400  |
| Middle Atlantic.....    | 10                               | 10                                | 10,594,700                                     | 10,732,400 | 10,594,700                                      | 10,732,400 |
| East North Central..... | 16                               | 16                                | 7,820,700                                      | 7,991,400  | 7,820,700                                       | 7,991,400  |
| West North Central..... | 12                               | 10                                | 2,634,500                                      | 2,683,500  | 2,518,500                                       | 2,566,400  |
| South Atlantic.....     | 21                               | 21                                | 2,890,700                                      | 2,981,900  | 2,860,700                                       | 2,981,900  |
| East South Central..... | 7                                | 6                                 | 1,028,300                                      | 1,048,300  | 980,700   | 1,000,100  |
| West South Central..... | 8                                | 7                                 | 1,260,700                                      | 1,307,600  | 1,227,800                                       | 1,274,100  |
| Mountain.....           | 9                                | 9                                 | 581,600  | 591,100    | 581,600   | 591,100    |
| Pacific.....            | 6                                | 4                                 | 1,996,400                                      | 2,046,400  | 1,512,100                                       | 1,548,000  |

## FOREIGN AND INSULAR

### THE FAR EAST

*Report for the week ended February 25, 1928.*—The following report for the week ended February 25, 1928, was transmitted by the eastern bureau of the health section of the secretariat of the League of Nations, located at Singapore, to the headquarters at Geneva:

Plague, cholera, or smallpox was reported present in the following ports:

|   | PLAQUE  |  | SIMALLPOX |
|---|---------|--|-----------|
| <i>Egypt.</i> —Suez.  |         | <i>Siam.</i> —Bangkok.   |           |
| <i>Aden Protectorate.</i> —Aden.                              |         | <i>French Indo-China.</i> —Saigon.   |           |
| <i>India.</i> —Bassein, Bombay, Rangoon.                      |         |  |           |
| <i>Ceylon.</i> —Colombo.                                      |         |  |           |
| <i>Straits Settlements.</i> —Singapore.                       |         |  |           |
| <i>Dutch East Indies.</i> —Makassar.                          |         |  |           |
|   | CHOLERA |  |           |
| <i>India.</i> —Bassein, Calcutta, Madras, Negapatam, Rangoon. |         | <i>Egypt.</i> —Alexandria.   |           |
|   |         | <i>Ceylon.</i> —Colombo.   |           |
|   |         | <i>India.</i> —Bombay, Calcutta, Cochin, Madras, Moulmein, Rangoon, Vizagapatam. |           |
|   |         | <i>French India.</i> —Pondicherry.   |           |
|   |         | <i>French Indo-China.</i> —Saigon.   |           |
|   |         | <i>Dutch East Indies.</i> —Belawan-Deli, Pontianak.                              |           |
|   |         | <i>China.</i> —Shanghai, Hong Kong.  |           |

Returns for the week ended February 25 were not received from the following ports:

*Dutch East Indies.*—Banjermassin, Samarinda.  
*Kwantung.*—Port Arthur, Dairen, towns of the South Manchurian Railway zone.  
*Union of Socialist Soviet Republics.*—Vladivostok.

### ARABIA

*Aden—Plague—January 9—February 22, 1928.*—A total of 303 cases of plague with 188 deaths has been reported at Aden for the period January 9 to February 22, 1928.

### BELGIAN CONGO

*Matadi—Yellow fever—January 26—February 19, 1928.*—During the period January 26 to February 6, 1928, 8 cases of yellow fever with 6 deaths were reported at Matadi, Belgian Congo. Of these, three cases with two deaths were in Europeans.

A suspect case of yellow fever was reported at the quarantine station of Ango Ango, below Matadi, February 9, 1928. The patient died February 10.

Quarantine was lifted at Matadi on February 19, 1928.

## CANADA

*Provinces—Communicable diseases—Week ended March 10, 1928.*—The Canadian Ministry of Health reports cases of certain communicable diseases from seven Provinces of Canada for the week ended March 10, 1928, as follows:

| Disease             | Nova Scotia | New Brunswick | Quebec | Ontario | Manitoba | Saskatchewan | Alberta | Total |
|---------------------|-------------|---------------|--------|---------|----------|--------------|---------|-------|
| Cerebrospinal fever |             |               |        | 1       |          |              |         | 1     |
| Influenza           | 12          |               |        | 13      |          | 3            |         | 28    |
| Smallpox            |             |               |        | 20      |          | 7            |         | 34    |
| Typhoid fever       | 2           | 7             |        | 8       |          |              | 1       | 18    |

*Quebec Province—Communicable diseases—Week ended March 10, 1928.*—The Bureau of Health of the Province of Quebec reports cases of certain communicable diseases for the week ended March 10, 1928, as follows:

| Disease        | Cases | Disease        | Cases |
|----------------|-------|----------------|-------|
| Chicken pox    | 50    | Scarlet fever  | 80    |
| Diphtheria     | 53    | Smallpox       | 18    |
| German measles | 21    | Tuberculosis   | 59    |
| Influenza      | 4     | Typhoid fever  | 7     |
| Measles        | 293   | Whooping cough | 29    |

## CUBA

*Santiago de Cuba—Malaria—March 17, 1928.*—Under date of March 17, 1928, 136 cases of malaria were reported at Santiago de Cuba.

## CZECHOSLOVAKIA

*Communicable diseases—January, 1928.*—During the month of January, 1928, communicable diseases were reported in Czechoslovakia as follows:

| Disease                  | Cases | Deaths | Disease           | Cases | Deaths |
|--------------------------|-------|--------|-------------------|-------|--------|
| Anthrax                  | 4     |        | Paratyphoid fever | 6     | 1      |
| Cerebrospinal meningitis | 25    | 3      | Puerperal fever   | 55    | 21     |
| Diphtheria               | 937   | 71     | Scarlet fever     | 1,372 | 36     |
| Dysentery                | 10    |        | Trachoma          | 226   |        |
| Malaria                  | 1     |        | Typhoid fever     | 455   | 34     |

## EGYPT

*Suez—Plague—February 19—March 1, 1928.*—During the week ended February 25, 1928, four cases of plague were reported at Suez, Egypt. On March 1, 1928, a fatal septicemic case was reported.

From January 1 to February 25, 1928, 17 cases of plague were reported at Suez, as compared with 13 cases during the corresponding period of 1927.

## ESTONIA

*Communicable diseases—January, 1928.*—During the month of January, 1928, communicable diseases were reported in the Republic of Estonia as follows:

| Disease                       | Cases | Disease            | Cases |
|-------------------------------|-------|--------------------|-------|
| Cerebrospinal meningitis..... | 7     | Scarlet fever..... | 402   |
| Diphtheria.....               | 48    | Tuberculosis.....  | 181   |
| Measles.....                  | 50    | Typhoid fever..... | 49    |

Population, estimated, 1,114,630.

## GREAT BRITAIN

*Leeds, England—Smallpox.*—Under date of March 5, 1928, two outbreaks of smallpox were reported in the Leeds consular district, with 11 cases. Both outbreaks were stated to be mild. The first outbreak occurred in the small mining village of Swillington, with 8 cases. At Leeds, three cases were reported March 1, 1928.

## JAPAN

*Influenza—January 1–February 10, 1928.*—The Home Office of Japan, at Tokyo, has published a statement that there were 27,411 cases of influenza with 395 deaths in Japan from January 1 to February 10, 1928. On March 17, 1928, conditions were said to have greatly improved.

## PERU

*Arequipa—Mortality from communicable diseases—December, 1927—January, 1928.*—Mortality from communicable diseases was reported at Arequipa, Peru, during the months of December, 1927, and January, 1928, as follows:

| Disease              | Deaths         |               | Disease            | Deaths         |               |
|----------------------|----------------|---------------|--------------------|----------------|---------------|
|                      | December, 1927 | January, 1928 |                    | December, 1927 | January, 1928 |
| Gastroenteritis..... | 15             | 11            | Scarlet fever..... | 1              |               |
| Influenza.....       | 2              | 2             | Tuberculosis.....  | 11             | 28            |
| Measles.....         | 1              | 1             | Typhus fever.....  | 1              | 2             |

Population: 44,300 in January, 1928.

*General mortality.*—The total number of deaths from all causes reported at Arequipa for the months of December, 1927, and January, 1928, was 61 and 92, respectively.

*Prevailing diseases.*—Diseases prevalent at Arequipa were stated to be bronchitis, pneumonia and broncho-pneumonia, enteritis and gastroenteritis in children; a few cases of smallpox, tuberculosis, typhoid fever, and typhus fever.

## SENEGAL

*Plague—January, 1928.*—During the month of January, 1928, five cases of plague were reported in Senegal, occurring in the interior.

## SYRIA

*Beirut—Smallpox outbreak—January—February, 1928.*—Under date of February 23, 1928, an outbreak of epidemic smallpox was reported at Beirut, Syria, with 46 cases reported from January 26 to February 19, 1928.

## URUGUAY

*Montevideo—Communicable diseases—November, 1927.*—During the month of November, 1927, communicable diseases were reported at Montevideo, Uruguay, as follows:

| Disease            | Cases | Deaths | Disease            | Cases | Deaths |
|--------------------|-------|--------|--------------------|-------|--------|
| Diphtheria.....    | 28    | 3      | Tuberculosis.....  | 145   | 95     |
| Measles.....       | 59    | 6      | Typhoid fever..... | 4     | 3      |
| Scarlet fever..... | 14    | -----  |                    |       |        |

Population, estimated, 439,129.

## VENEZUELA

*Tacata and Cua, State of Miranda—Plague—March 11, 1928.*—Under date of March 14, 1928, plague was reported at Tacata and Cua, in the State of Miranda, Venezuela, about 100 kilometers from Caracas, near the State of Aragua. The last case was said to have been reported March 11. Precautions against the spread of the disease were taken.

## VIRGIN ISLANDS

*Communicable diseases—February, 1928.*—During the month of February, 1928, communicable diseases were reported in the Virgin Islands of the United States as follows:

| Island and disease       | Cases | Remarks                    |
|--------------------------|-------|----------------------------|
| St. Thomas and St. John: |       |                            |
| Chancroid.....           | 2     |                            |
| Gonorrhea.....           | 5     |                            |
| Leprosy.....             | 2     | Secondary, 2.              |
| Pellagra.....            | 1     |                            |
| Syphilis.....            | 3     | Secondary, 2.              |
| Whooping cough.....      | 1     |                            |
| St. Croix:               |       |                            |
| Syphilis.....            | 3     | Secondary.                 |
| Uncinariasis.....        | 7     | <i>Necator americanus.</i> |

## CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, health sections of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final, as regards either the list of countries included or the figures for the particular countries for which reports are given.

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[IC indicates cases; D, deaths; P, present.]

| Place                              | July, 1927 |       |       | August, 1927 |       |       | September, 1927 |       |       | October, 1927 |       |       | November, 1927 |       |       | December, 1927 |       |       | January, 1928 |       |       |
|------------------------------------|------------|-------|-------|--------------|-------|-------|-----------------|-------|-------|---------------|-------|-------|----------------|-------|-------|----------------|-------|-------|---------------|-------|-------|
|                                    | 1-10       | 11-20 | 21-30 | 1-10         | 11-20 | 21-31 | 1-10            | 11-20 | 21-31 | 1-10          | 11-20 | 21-31 | 1-10           | 11-20 | 21-31 | 1-10           | 11-20 | 21-31 | 1-10          | 11-20 | 21-31 |
| India (French):                    |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |
| Chandernagor                       | C          | 1     | 1     | 1            | 1     | 1     | 6               | 2     | 2     | 2             | 2     | 2     | 6              | 3     | 4     | 1              | 1     | 1     | 1             | 1     | 1     |
| Karikal                            | D          | 1     | 16    | 1            | 1     | 1     | 1               | 1     | 1     | 1             | 1     | 1     | 4              | 2     | 2     | 1              | 2     | 1     | 9             | 7     | 5     |
| Madras                             | C          | 56    | 12    | 1            | 1     | 1     | 1               | 1     | 1     | 1             | 1     | 1     | 1              | 1     | 1     | 1              | 1     | 1     | 1             | 1     | 1     |
| Pondicherry                        | D          | 45    | 12    | 15           | 15    | 15    | 6               | 3     | 17    | 4             | 1     | 1     | 4              | 1     | 2     | 3              | 2     | 3     | 5             | 4     | 3     |
| Portblair                          | D          | 37    | 12    | 11           | 16    | 1     | 1               | 6     | 1     | 15            | 6     | 1     | 1              | 2     | 1     | 1              | 1     | 1     | 1             | 1     | 1     |
| Indo-China: Saigon                 | D          | 24    | 11    | 1            | 1     | 1     | 1               | 1     | 1     | 1             | 1     | 1     | 1              | 1     | 1     | 1              | 1     | 1     | 1             | 1     | 1     |
| Iraq <sup>1</sup>                  | D          | 1     | 1     | 1            | 1     | 1     | 1               | 1     | 1     | 1             | 1     | 1     | 1              | 1     | 1     | 1              | 1     | 1     | 1             | 1     | 1     |
| Japan: Yokohama                    | C          | 1     | 1     | 1            | 1     | 1     | 1               | 1     | 1     | 1             | 1     | 1     | 1              | 1     | 1     | 1              | 1     | 1     | 1             | 1     | 1     |
| Philippine Islands: Manila         | D          | 90    | 1     | 1            | 1     | 1     | 1               | 1     | 1     | 1             | 1     | 1     | 1              | 1     | 1     | 1              | 1     | 1     | 1             | 1     | 1     |
| Thailand: Siam                     | D          | 81    | 77    | 40           | 18    | 10    | 10              | 20    | 18    | 32            | 24    | 24    | 13             | 40    | 30    | 35             | 48    | 34    | 21            | 42    | 34    |
| Bangkok                            | D          | 59    | 33    | 24           | 11    | 76    | 11              | 10    | 13    | 21            | 18    | 20    | 5              | 36    | 34    | 11             | 28    | 34    | 23            | 17    | 17    |
| Straits Settlements: Singapore     | D          | 6     | 2     | 3            | 5     | 4     | 4               | 4     | 1     | 1             | 2     | 1     | 1              | 3     | 5     | 7              | 16    | 26    | 17            | 12    | 11    |
| On vessel:                         |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |
| S. S. Adrastus: At Yokohama, Japan | C          | 1     | 1     | 1            | 1     | 1     | 1               | 1     | 1     | 1             | 2     | 2     | 2              | 3     | 16    | 3              | 2     | 2     | 1             | 1     | 1     |
| S. S. Tabaristan: At Basra, Iraq   | D          | 1     | 1     | 1            | 1     | 1     | 1               | 1     | 1     | 1             | 1     | 1     | 1              | 4     | 5     | 2              | 1     | 1     | 1             | 1     | 1     |

<sup>1</sup> From July 10 to Dec. 26, 1927, 1,479 cases of cholera were reported in Iraq, with 1,063 deaths, as follows: Amarah Liwa, 201 cases, 206 deaths; Baghdad Liwa, 80 cases, 60 deaths; Basra Liwa, 421 cases, 330 deaths; Diwanah Liwa, 122 cases, 72 deaths; Diyala Liwa, 1 case, 1 death; Dujail Liwa, 100 cases, 60 deaths; Hillah Liwa, 105 cases, 71 deaths; Kut Liwa, 244 cases, 44 deaths; Muntafiq Liwa, 66 cases, 44 deaths; Muntafiq Liwa, 70 cases, 60 deaths; Muntafiq Liwa, 151 deaths.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAQUE

[C indicates cases; D, deaths; P, present]

D321  
Baker.....  
January, 1928, 5 cases were reported in interior of Senegal.

**SCHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued**

## PLAQUE—Continued

[C indicates cases; D, deaths; P, present]

| Place                      | July | Aug | Sep | Oct  | Nov   | Decem | Janu | Place                 | July | Aug | Sep | Octo | Novem | Decem | Janu |
|----------------------------|------|-----|-----|------|-------|-------|------|-----------------------|------|-----|-----|------|-------|-------|------|
|                            | July | Aug | Sep | Octo | Novem | Decem | Janu |                       | July | Aug | Sep | Octo | Novem | Decem | Janu |
|                            | 61   | 21  | 18  | 28   | 16    | 26    | 20   |                       | 48   | 142 | 90  | 170  | 190   | 108   | 190  |
| Algeria: Algiers           | C    | 13  | 61  | 21   | 18    | 28    | 16   | Madagascar—Continued. | C    | 21  | 48  | 90   | 170   | 190   | 190  |
| British East Africa: Kenya | C    | 5   | 7   | 3    | 4     | 5     | 3    | Tananaive Province    | D    | 19  | 43  | 127  | 153   | 108   | 108  |
| Ecuador: Guayaquil         | D    | 14  | 14  | 3    | 3     | 2     | 4    | Mauritius             | C    | 9   | 8   | 27   | 16    | 16    | 16   |
| Indo-China (French)        | C    | 46  | 98  | 170  | 166   | 209   | 317  | Nigeria               | D    | 7   | 8   | 14   | 27    | 16    | 16   |
| Madagascar                 | C    | 46  | 98  | 154  | 154   | 180   | 261  | Peru                  | C    | 8   | 11  | 15   | 14    | 16    | 16   |
| Ambonite Province          | D    | 43  | 80  | 154  | 154   | 180   | 261  | Callao                | D    | 7   | 6   | 5    | 2     | 4     | 4    |
| Antsirabe Province         | D    | 6   | 1   | 6    | 6     | 1     | 10   | Lima                  | D    | 3   | —   | —    | 3     | 3     | 3    |
| Itasy Province             | D    | 34  | 5   | 5    | 19    | 18    | 72   | Syria: Beirut         | C    | —   | —   | 1    | 1     | 1     | 1    |
| Mananara Province          | D    | 34  | 4   | 4    | 19    | 17    | 72   | —                     | D    | —   | —   | 1    | 1     | 1     | 1    |
| Itasy Province             | C    | 14  | 11  | 21   | 16    | 26    | 62   | —                     | —    | —   | —   | —    | —     | —     | —    |
| Mananara Province          | D    | 14  | 7   | 20   | 15    | 25    | 54   | —                     | —    | —   | —   | —    | —     | —     | —    |
| Mananara Province          | C    | 5   | 4   | 3    | 24    | 46    | 25   | —                     | —    | —   | —   | —    | —     | —     | —    |
| Mananara Province          | D    | 5   | 4   | 3    | 20    | 41    | 22   | —                     | —    | —   | —   | —    | —     | —     | —    |

## SMALLPOX

| Place                                   | Week ended—           |     |     |                        |     |    |                        |     |    |                       |    |     | March, 1928   |    |     |                |     |     |               |     |     |                |     |
|---|-----------------------|-----|-----|------------------------|-----|----|------------------------|-----|----|-----------------------|----|-----|---------------|----|-----|----------------|-----|-----|---------------|-----|-----|----------------|-----|
|   | July 31-Aug. 27, 1927 |     |     | Aug. 28-Sept. 24, 1927 |     |    | Sept. 25-Oct. 22, 1927 |     |    | Oct. 23-Nov. 19, 1927 |    |     | Nov. 20, 1927 |    |     | December, 1927 |     |     | January, 1928 |     |     | February, 1928 |     |
| Algeria: Algiers                        | C                     | 459 | 382 | 683                    | 661 | —  | 68                     | 55  | 47 | 81                    | 26 | 7   | 15            | 17 | 18  | 11             | —   | —   | —             | —   | —   | —              | —   |
| Algeria: Oran                           | C                     | 9   | 16  | 11                     | 20  | 9  | 11                     | 10  | 3  | 3                     | 4  | —   | 2             | 2  | 3   | 1              | 7   | —   | —             | —   | —   | —              | —   |
| Arabia: Aden                            | C                     | —   | —   | —                      | 1   | 1  | 1                      | 1   | 1  | 1                     | —  | —   | 2             | 4  | 2   | 2              | 4   | —   | —             | —   | —   | —              | —   |
| Brazil: Para                            | C                     | 1   | 10  | —                      | —   | 1  | —                      | —   | —  | —                     | —  | —   | —             | —  | —   | —              | —   | —   | —             | —   | —   | —              | —   |
| Brazil: Rio de Janeiro                  | C                     | 6   | 10  | —                      | —   | 1  | —                      | —   | —  | —                     | —  | —   | —             | —  | —   | —              | —   | —   | —             | —   | —   | —              | —   |
| British East Africa: Tanganyiki         | D                     | 4   | 9   | 8                      | P   | P  | P                      | P   | P  | P                     | P  | P   | P             | P  | P   | P              | P   | P   | P             | P   | P   | P              | P   |
| British South Africa: Northern Rhodesia | D                     | 21  | 8   | P                      | P   | P  | P                      | P   | P  | P                     | P  | P   | P             | P  | P   | P              | P   | P   | P             | P   | P   | P              | P   |
| Southern Rhodesia                       | C                     | 55  | 39  | 164                    | 185 | 57 | 15                     | 125 | 55 | 2                     | 81 | 141 | 12            | 3  | 220 | 220            | 220 | 220 | 220           | 220 | 220 | 220            | 220 |
|   | D                     | 1   | 2   | 11                     | 64  | 15 | 7                      | 28  | 9  | 2                     | 8  | 23  | 2             | 1  | 2   | 2              | 2   | 2   | 2             | 2   | 2   | 2              | 2   |

1 Plague was reported at Tanta and Cus, State of Miranda, Venezuela, Mar. 11, 1928.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present.]



**CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued**

SUMMARY—Continued

IC indicates cancer; D, death; P, present.

March 30, 1928

|                                       |       | July, 1927 |       |       | August, 1927 |       |       | September, 1927 |       |       | October, 1927 |       |       | November, 1927 |       |       | December, 1927 |       |       | January, 1928 |       |       | February, 1928 |       |       |    |
|---------------------------------------|-------|------------|-------|-------|--------------|-------|-------|-----------------|-------|-------|---------------|-------|-------|----------------|-------|-------|----------------|-------|-------|---------------|-------|-------|----------------|-------|-------|----|
|                                       |       |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
|                                       |       |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Place                                 | Place | 1-10       | 11-20 | 21-30 | 1-10         | 11-20 | 21-31 | 1-10            | 11-20 | 21-31 | 1-10          | 11-20 | 21-31 | 1-10           | 11-20 | 21-31 | 1-10           | 11-20 | 21-31 | 1-10          | 11-20 | 21-31 | 1-10           | 11-20 | 21-31 |    |
| Algeria                               | C     | 376        | 479   | 382   | 682          | 10    | 11    | 13              | 3     | 22    | 10            | 4     | 20    | 1              | 40    | 1     | 40             | 18    | 1     | 1             | 1     | 1     | 1              | 1     | 1     | 1  |
| Oran                                  | C     | 14         | 10    | 16    | 11           | 21    | 21    | 25              | 13    | 3     | 22            | 10    | 4     | 20             | 1     | 40    | 1              | 40    | 18    | 1             | 1     | 1     | 1              | 1     | 1     | 1  |
| Indo-China                            | C     | 19         | 3     | 3     | 3            | 3     | 3     | 3               | 5     | 5     | 22            | 13    | 4     | 4              | 6     | 2     | 11             | 2     | 15    | 11            | 2     | 15    | 11             | 2     | 15    | 11 |
| Syria                                 |       |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Aleppo                                | C     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Beirut                                | C     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Damascus                              | C     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Manzanillo                            | D     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Mexico City and surrounding territory | C     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Monterey                              | C     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| San Luis Potosi                       | D     | 1          |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Tampico                               | C     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Torreon                               | D     | 1          |       | 2     |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Palestine: Jerusalem                  | C     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Paraguay                              | D     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Peru: Tarapaca                        | D     | 2          |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Poland                                | D     | 1          |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Portugal                              | C     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Lisbon                                | D     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Porto Rico <sup>1</sup>               | C     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Spain                                 | C     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Senegal: Dakar                        | C     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Siam                                  | C     | 31         | 27    | 6     | 1            | 8     |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Bangkok                               | D     | 10         | 16    | 3     | 1            | 1     |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Spain: Malaga                         | D     |            |       | 1     |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Seville                               | C     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Valencia                              | C     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Straits Settlements: Singapore        | C     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Switzerland                           | C     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Tunisia: Tunis                        | C     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Union of South Africa: Cape Province  | C     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Orange Free State                     | C     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Transvaal                             | C     |            |       |       |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |
| Venezuela: Maracaibo                  | D     | 2          |       | 1     |              |       |       |                 |       |       |               |       |       |                |       |       |                |       |       |               |       |       |                |       |       |    |

87534°—28

<sup>1</sup> An epidemic of smallpox near Pajardo, P. R., was officially reported Mar. 19, 1928.

CHOLEERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

IC indicates *incomplete cases*; D, deaths; P, present.

| Place                         | July | August | September | October | November | December | January | February | March | April | May | June | July | August | September | October | November | December | January |
|-------------------------------|------|--------|-----------|---------|----------|----------|---------|----------|-------|-------|-----|------|------|--------|-----------|---------|----------|----------|---------|
| Angola                        | C    | 42     | 2         | 5       | 73       | 71       |         |          |       |       |     |      | C    | 3      | 3         | 4       | 4        | 4        | 6       |
| Congo                         | D    |        |           | 5       | 2        |          |         |          |       |       |     |      | C    | 33     | 73        | 45      | 2        | 5        |         |
| Cuanza-Norte                  | C    |        |           | 1       | 77       |          |         |          |       |       |     |      | D    | 53     | 76        | 140     | 401      | 35       |         |
| Cuanza-Sul                    | C    |        |           | 1       | 2        |          |         |          |       |       |     |      | C    | 492    | 91        | 237     | 93       |          |         |
| Luanda                        | C    |        |           | 1       | 2        |          |         |          |       |       |     |      | C    | 83     | 20        | 70      | 51       |          |         |
| Zaire                         | C    |        |           | 3       | 4        | 1        |         |          |       |       |     |      | D    |        |           |         |          |          |         |
| Brazil: Porto Alegre          | C    | 5      | 3         | 3       | 4        | 1        |         |          |       |       |     |      | D    |        |           |         |          |          |         |
| British East Africa: Zanzibar | D    |        |           | 2       | 2        |          |         |          |       |       |     |      | D    |        |           |         |          |          |         |
| Chesone                       | D    | 10     | 2         |         | 2        |          |         |          |       |       |     |      | C    | 11     | 6         | 9       | 7        | 11       |         |
| Ecuador, Guayaquil            | D    | 6      |           |         | 2        | 2        |         |          | 1     | 4     | 2   |      | C    | 146    | 111       | 100     | 220      |          |         |
| France                        | C    | 23     | 6         | 8       | 7        | 1        |         | 1        | 4     | 14    | 11  |      | C    | 36     | 20        | 15      | 40       | 21       |         |
| Gold Coast                    | C    | 1      | 1         | 5       | 4        |          |         |          |       |       |     |      | C    | 16     | 4         | 7       | 11       | 20       |         |

## TYPHUS FEVER

| Place   | 1927   |        |                | November, 1927 |        |        | December, 1927 |        |        | Jan. 1-10,<br>1928 |  |
|---|--------|--------|----------------|----------------|--------|--------|----------------|--------|--------|--------------------|--|
|   | July   | August | Septem-<br>ber | October        | 1-10   | 11-20  | 21-30          | 1-10   | 11-20  | 21-31              |  |
| China:<br>Manchuria—Harbin                                | C<br>C | 2<br>2 | 3<br>3         | 1<br>4         | 1<br>5 | 7<br>1 | 3<br>1         | 1<br>2 | 1<br>1 | 1<br>1             |  |
| Tienhsin  | C      | 3      | 3              | 3              | 3      | 1      | 1              | 1      | 1      | 1                  |  |
| Egypt   | D      | 3      | 3              | 3              | 3      | 1      | 1              | 1      | 1      | 1                  |  |
| Cairo   | C      | 1      | 1              | 1              | 1      | 1      | 1              | 1      | 1      | 1                  |  |
| Port Said   | C      | 1      | 1              | 1              | 1      | 1      | 1              | 1      | 1      | 1                  |  |
| Ireland (Irish Free State):<br>Cork County                | C      | 1      | 1              | 1              | 1      | 1      | 1              | 1      | 1      | 1                  |  |
| Donegal County, Letterkenny                               | C      | 4      | 4              | 3              | 3      | 1      | 1              | 1      | 1      | 1                  |  |
| Mexico:<br>Guadalajara                                    | D      | 17     | 19             | 18             | 26     | 7      | 6              | 4      | 4      | 3                  |  |
| Mexico City, including municipalities in Federal District | C      | 11     | 1              | 3              | 3      | 1      | 2              | 1      | 1      | 2                  |  |
| Morocco   | C      | 30     | 35             | 19             | 64     | 13     | 17             | 35     | 33     | 30                 |  |
| Palestine   | C      | 6      | 2              | 4              | 11     | 1      | 5              | 4      | 1      | 2                  |  |
| Poland  | D      | 1      | 1              | 1              | 1      | 1      | 1              | 1      | 1      | 1                  |  |
| Portugal: Oporto  | C      | 30     | 16             | 17             | 22     | 6      | 8              | 13     | 32     | 214                |  |
| Romania   | D      | 1      | 1              | 2              | 2      | 1      | 1              | 1      | 1      | 2                  |  |
| Syria: Aleppo   | C      | 14     | 1              | 3              | 1      | 1      | 1              | 1      | 1      | 1                  |  |
| Tunisia   | C      | 1      | 1              | 1              | 1      | 1      | 1              | 1      | 1      | 1                  |  |
| Union of South Africa:                                    |        |        |                |                |        |        |                |        |        |                    |  |
| Capetown Province   | C      | 1      | 1              | 1              | 1      | 1      | 1              | 1      | 1      | 1                  |  |
| Natal   | C      | 1      | 1              | 1              | 1      | 1      | 1              | 1      | 1      | 1                  |  |
| Orange Free State   | C      | 1      | 1              | 1              | 1      | 1      | 1              | 1      | 1      | 1                  |  |
| Transvaal   | C      | 1      | 1              | 1              | 1      | 1      | 1              | 1      | 1      | 1                  |  |

1. MARCH 1928. (CONT'D.) 2. MARCH 1928. 3. MARCH 1928. 4. MARCH 1928. 5. MARCH 1928. 6. MARCH 1928. 7. MARCH 1928.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

## TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

YELLOW FEVER

| Place             | July |   |   |   | August |   |   |   | September |   |   |   | October |   |   |   |
|-------------------|------|---|---|---|--------|---|---|---|-----------|---|---|---|---------|---|---|---|
|                   | C    | D | C | D | C      | D | C | D | C         | D | C | D | C       | D | C | D |
| Dahomey           |      |   |   |   |        |   |   |   |           |   |   |   |         |   |   |   |
| Grand Popo        |      |   |   |   |        |   |   |   |           |   |   |   |         |   |   |   |
| Porto Novo        |      |   |   |   |        |   |   |   |           |   |   |   |         |   |   |   |
| Ivory Coast       |      |   |   |   |        |   |   |   |           |   |   |   |         |   |   |   |
| Liberia: Monrovia |      |   |   |   |        |   |   |   |           |   |   |   |         |   |   |   |
| Nigeria           |      |   |   |   |        |   |   |   |           |   |   |   |         |   |   |   |
| Senegal           |      |   |   |   |        |   |   |   |           |   |   |   |         |   |   |   |
| Dakar             |      |   |   |   |        |   |   |   |           |   |   |   |         |   |   |   |
| Topland           |      |   |   |   |        |   |   |   |           |   |   |   |         |   |   |   |

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